NETWORK WORLD

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Crescendo to deliver FDDI over copper

By Joanne Cummings
Staff Writer

SAN JOSE, Calif. — Crescendo, Inc. plans to unveil next week the industry's first Fiber Distributed Data Interface products capable of supporting 100M bit/sec data rates over unshielded twisted-pair wiring.

The products, to be introduced at the INTEROP 91 Fall show here, include an adapter for Sun Microsystems, Inc.'s SPARCstation and a work group concentrator to link SPARCstations.

Although first to market with FDDI products for unshielded twisted pair, Crescendo uses a proprietary encoding scheme that may not conform with the standards the ANSI's X3T9.5 committee is establishing for running FDDI over copper, analysts warned.

Crescendo's proprietary three-level encoding scheme, called Copper Distributed Data Interface (CDDI), makes it possible to support 100M bit/sec speeds on unshielded wire without radiating more than 30 MHz of electrical emissions, the Federal Communications Commission limit. Higher emission levels can interfere with other types of radio communications.

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PHOTO ©1991 CHUCK POTTER

Bill Pfeiffer, senior vice-president of Sprint Data Group, discusses the carrier's frame relay plans and pricing, page 48.

HP centralizes control of networks to rein in costs

By Barton Crockett
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. has embarked on a dramatic restructuring of its network and computer operations to significantly cut costs and make the company more customer-focused.

Among other moves, HP is centralizing control over more than 500 network personnel, reassigning some 200 net staffers to local-area network support, consolidating more than a hundred data centers into a handful of facilities and redeploying application programmers to better support business units.

The restructuring dovetails with a major organizational shift HP began last year, according to Lloyd Taylor, HP's director of corporate information systems (IS). The company, which had long been a proponent of decentralization, made a strategic tilt toward centralization as a way to improve profitability.

"We are fine-tuning our organization to get the strategic things, like application support, linked more to the business units, and to get more general things, like data centers and networks, managed on a more efficient basis," Taylor said.

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BT delivers on frame relay, details pricing

Says ExpressLane service now available across U.S., reveals plans to extend service globally.

By Anita Taff
Washington Bureau Chief

SAN DIEGO — BT North America, Inc. last week laid out pricing for its new frame relay service and said the offering is now commercially available in 160 U.S. cities.

The news came during the 1991 TCA Annual Conference here, where frame relay rival US Sprint Communications Co. announced availability dates and a pricing structure for its service, although it did not reveal specific pricing.

BT North America said its service, dubbed ExpressLane, will be priced at a flat rate of $2,100 per month. That price includes use of a frame relay-capable bridge or router and software provided by BT North America, dedicated port access, a 56K or 64K bit/sec access line up to 60 miles long and unlimited frame transmission.

Users that already have equipment can buy the service on an unbundled basis.

BT North America, which is the U.S. subsidiary of British Telecommunications PLC, also said it will roll out service to London and Paris in October and to Amsterdam and Frankfurt, Germany, early next year.

Although the company is three months late in introducing its do-

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INTERNETWORKING NEWS

IBM, BT plan OSI link for net mgmt.

By Barton Crockett and Paul Desmond
Network World Staff

GENEVA — British Telecommunications PLC (BT) and IBM plan to demonstrate an OSI link between their integrated net management systems at Telecom '91 here next week.

The event will represent the first time IBM has demonstrated NetView support for Open Systems Interconnection network management standards.

IBM is also expected to announce plans to offer a commercial version of the link, which is based on the OSI Common Management Information Protocol (CMIP) and the OSI/Network Management (NM) Forum Release 1 specifications, according to sources familiar with the company's plans.

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NETLINE

NEWSPAPER

FEATURE

Big users start moving to X.500 but face problems

By Patricia Cope
Special to Network World

News about the X.500 directory services standard has been all over the press in recent months. The major public network carriers, for example, are experimenting with interconnecting their name directories. And some of the largest network users — Hughes Aircraft Co., Rockwell International Corp., TRW, Inc. and Xerox Corp. — are registering their network addresses with ANSI.

But the questions users need to ask themselves are: Does my company need X.500? Will we in the immediate future?

In general, most analysts hold that X.500 may not be necessary in the short term for organizations that already have electronic mail directories

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Netrix adds low-end switch based on new architecture

New circuit/packet switch features RISC-based frame relay and supports parallel processing.

By Paul Desmond
Senior Editor

SAN JOSE, Calif. — At INTEROP 91 Fall here next week, Netrix Corp. plans to announce a low-end model of its #1-ISS circuit/packet switch that features Reduced Instruction Set Computer (RISC)-based frame relay processing and a parallel processing switching architecture.

The new #1-ISS Series 1000 is intended for use in mesh networks without high-bandwidth requirements, or as feeder nodes to larger nets based on the #1-ISS Series 10 or any other vendor's multiplexer.

The Series 1000 offers the same networking features as the Series 10 — such as dynamic bandwidth allocation between circuit, X.25 and frame relay applications — but in a smaller package that supports between 20 and 64 ports.

"This announcement is really an evolutionary phase for a company like Netrix," said Rick Malone, a principal at Vertical Systems Group, a consultancy in Dedham, Mass. "They've essentially run into a market requirement that says lower cost units and extensions to older products are required for remote sites."

Netrix will offer three models in the Series 1000 line. The Models 1205, 1207 and 1216 have a

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IBM rolls out AIX version of T-1 mux control system

NET to follow with SNMP manager for IDNX line.

By Paul Desmond
Senior Editor

WHITE PLAINS, N.Y. — IBM last week unveiled a new AIX version of its T-1 multiplexer management system that offers greater performance and supports more nodes than an existing OS/2 version.

The IBM AIX Transmission Network Manager (TNM)/6000 fulfills an IBM statement of direction to produce a RISC System/6000 version of the management system for its Transmission Resource Manager T-1 multiplexers, which is IBM's label for the Network Equipment Technologies, Inc. (NET) IDNX multiplexers it resells.

NET, in a separate announcement scheduled for today, will unveil the NET SNMP Manager. Based on Hewlett-Packard Co.'s OpenView, the product manages devices that support the Simple Network Management Protocol.

Chuck Sannipoli, manager of bandwidth management systems at IBM, said TNM/6000 has all the features of the OS/2-based TNM but supports as many as 128 IDNX nodes, up from 32. It also handles new IDNX features including a voice compression card and an analog voice card.

With the Reduced Instruction Set Computer base of the RS/6000, Sannipoli said the

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Sniffer gets smarter with new expert systems version

By Caryn Gillooly
Senior Editor

MENLO PARK, Calif. — Network General Corp. last week unveiled an expert systems-based version of its Sniffer network analyzer that industry experts say will change the face of LAN administration.

The Expert Sniffer will not only monitor network activity but also automatically identify faults, warn administrators of potential problems and recommend possible solutions.

"This is a qualified network analyst in a box," said Craig Burton, president of Clarke Burton Corp., a research and consulting firm in Salt Lake City. "This will up the expectation of what management utilities can do."

Like Network General's previous generation software, the Expert Sniffer runs on either a personal computer or laptop. Users with older Sniffer versions may use the same device for the Expert Sniffer.

The software initially will be available to monitor Ethernet and token-ring local-area networks. The first release, expected in mid-1992, will decode the Transmission Control Protocol/

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Briefs

LECs to trial SMDS link. Pacific Bell and GTE Corp. last week launched the first trial of Switched Multimegabit Data Service between local telephone exchange companies. The six-month test will link Rockwell International Corp. facilities in both companies' territories. The link will connect Ethernet local-area networks at Rockwell's Rocketdyne division in Canoga Park, Calif., and a Cray Research, Inc. supercomputer at Rockwell's Information Systems Center at Seal Beach, Calif.

In related SMDS news . . . MCI Communications Corp. last week told members of the Independent T-1 Users Group that it will trial Switched Multimegabit Data Service (SMDS) with local exchange carriers in 1992. Anthony Russo, director of product marketing for data services, said the firm will experiment with the technology later this year and move to a formal test of the service next year. This would be the first SMDS interexchange trial.

AT&T rolls out fast packet switch. AT&T Network Systems last week introduced the BNS-1000 Fast Packet Switch as part of its new BNS-1000 Broadband Networking Family, a line of local-area network internetworking devices. The new switch supports asynchronous and frame relay interfaces and is said to support as many as 15,000 virtual circuits and switch up to 44K packet/sec. It connects LANs over subrate digital, fractional T-1 and T-1 lines, providing bandwidth-on-demand and automatic alternate routing, AT&T said. An entry-level model costs $30,000 and is available now.

HP backs OSPF, frame relay. Hewlett-Packard Co. will announce today that its EtherTwist routers will support the Open Shortest Path First (OSPF) protocol. OSPF offers various capabilities not found in the widely used Routing Information Protocol, including least-cost routing, area routing for reduced network traffic and routing authentication for network security. HP said it expects to offer OSPF on its HP Router and Router ER by November and frame relay support by mid-1992.

GSA says FAA can shun FTS 2000. The General Services Administration late last week dropped its efforts to force the air traffic control system onto FTS 2000. In an agreement announced with the Federal Aviation Administration (FAA), the GSA said the FAA could proceed with its plans to replace today's air traffic control system with the Leased Interfacility National Communications System (LINCS). The award for the LINCS contract — which had been scheduled for this fall before GSA ordered the procurement suspended in May — is now expected early next year. In a compromise, the FAA agreed to convert at least 1,100 of the less critical air traffic control circuits to FTS 2000.

Users want private-line price review. The Ad Hoc Telecommunications Users Committee last week asked the Federal Communications Commission to suspend and investigate recent AT&T tariffs that raise monthly rates for analog private line. The user group charged that the rate hikes violate the FCC's new price cap rules, which go into effect within the next 60 days. By filing the rate hikes before price caps go into effect, "AT&T seeks to avoid the close scrutiny a later line [increase] would draw," the group alleged.

AT&T to join N.Y. task force. Under pressure from New York City Mayor David Dinkins, AT&T last week agreed to join the Mayor's Telecommunications Task Force on Mutual Aid and Restoration. AT&T had come under fire by the mayor for its refusal to join the task force subcommittee that was set up in September 1990 to develop a restoration plan to deal with emergency outages. A spokesman claimed AT&T never opposed joining the group and said that, in joining, AT&T has only agreed to devise a backup plan with carriers and the city.

Last of Tariff 15s fade away. As expected, the Federal Communications Commission last week rejected AT&T's four remaining Tariff 15 deals, which were for American Home Products Corp., Drew University in Madison, N.J., the University of San Francisco and the University of San Diego, and West Telemarketing Corp. In determining Tariff 15 to be unlawfully discriminatory, the FCC pointed to its Aug. 1 order in which it decided AT&T's Tariff 15 plan for Resorts Condominiums International, Inc. had "serious potential anticompetitive consequences."

CONTENTS

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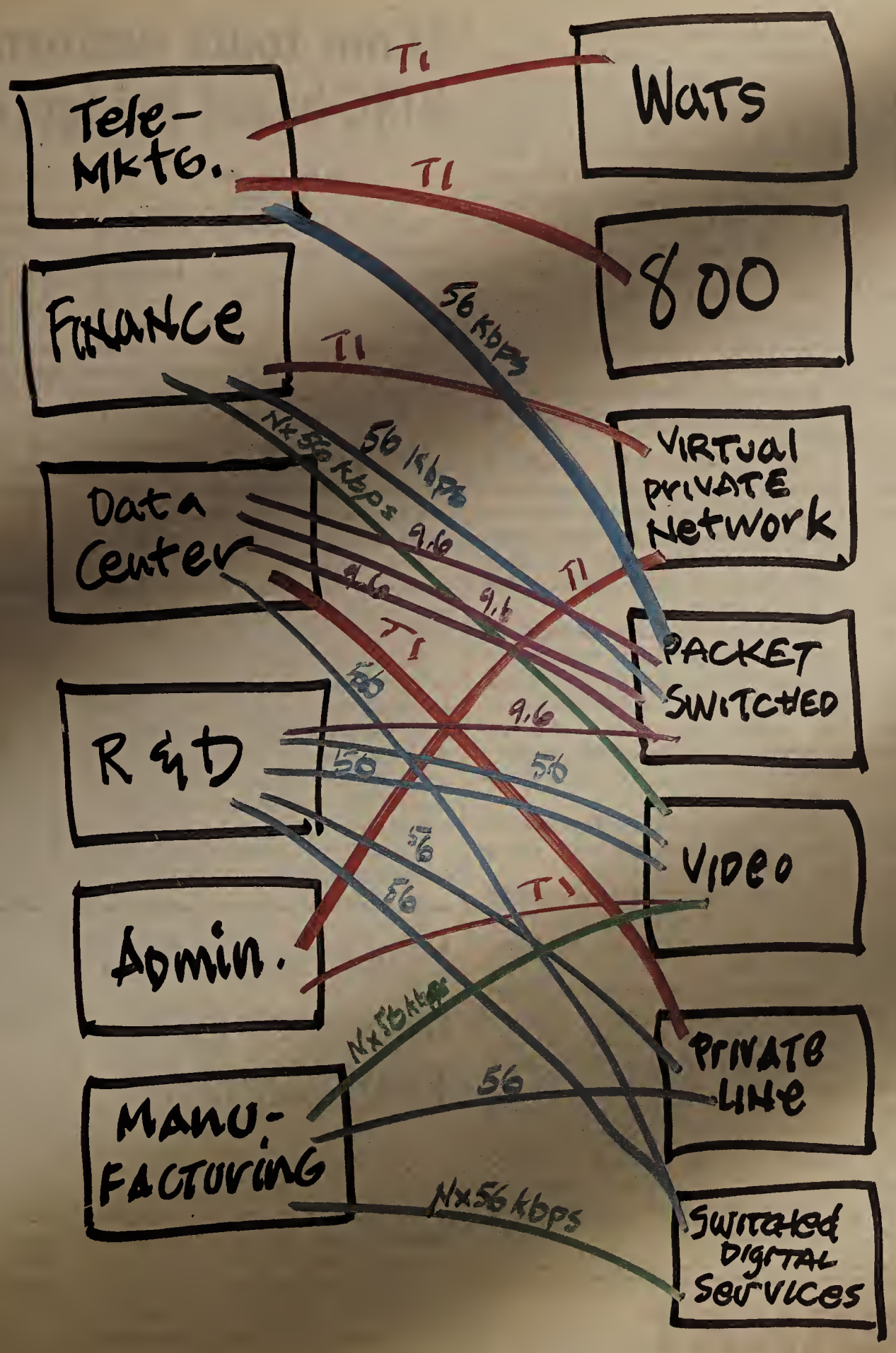
1980 *Sprint introduced the first major public e-mail service.* 1985 *Sprint introduces the world's first virtual private network.* 1987 *Eight million FONCARDs℠ distributed in first year.*



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1989 *Sprint completes PTAT-1, the world's first and largest privately owned transatlantic fiber optic cable.* 1991 *Sprint transmits the first commercial video services to the Soviet Union.*

Moscom offers new weapon to fight toll fraud

By Bob Wallace
Senior Editor

SAN DIEGO — Moscom Corp. last week announced a product to combat toll fraud that uses speech recognition technology to prevent hackers from placing unauthorized calls through corporate telephone switches.

VoiceLock, unveiled at the Tele-Communications Association, Inc. (TCA) show here, is based on a personal computer that can be linked via an RJ-21 interface to an AT&T, Northern Telecom, Inc. or Rolm Co. private branch exchange.

The device is designed to distinguish hackers from authorized personnel who are trying to dial into a switch to gain access to corporate long-distance facilities.

Due to the fact that hackers have become so proficient at overcoming the standard safeguards on PBX remote access features, carriers and other sources estimate that the fraud problem costs the industry $1.2 billion to $1.5 billion per year.

With VoiceLock, users calling in on Direct Inward System Access (DISA) ports are prompted to enter a seven-digit authorization code and then press the pound key. The system checks the code against a data base and, if valid, prompts the caller to give a two-word password.

VoiceLock digitizes the spoken password and performs a waveform analysis to determine if it matches a prerecorded voiceprint.

If the password and the voiceprint match, the caller is permitted to dial outbound calls through the PBX according to his calling privileges. If a caller, for example, attempts to place an international call but is only allowed to place domestic calls, VoiceLock blocks the call and reminds the caller of his service restrictions.

Arlene Myhre, TCA Northwest Chapter president and a communications specialist with the Snohomish County Public Utility District in Everett, Wash., said products such as VoiceLock could help TCA members, many of which have been victimized by toll fraud. Individual TCA chapters, in fact, are planning to hold PBX fraud seminars for their members.

Myhre noted that one way of defending against hackers is to simply stop using DISA ports for remote access. "We don't use DISA ports," she said. "It's like opening the door to hackers."

But users who choose to employ DISA ports can use VoiceLock to safeguard their switches.

When the system is first installed or new users are added, VoiceLock passwords are established when employees dial into the system and say their password three times. VoiceLock averages the two clearest word strings and stores a master voiceprint in the system.

VoiceLock continually averages the master voiceprint against voiceprint recordings of the seven most recent successful access attempts. The continual averaging enables the system to track degradation or changes in the speaker's voice brought on by medical ailments such as colds or laryngitis.

Jim Gulley, Moscom's vice-president of sales, suggests that employees change their password once a month.

VoiceLock works with AT&T's Definity Generic 1 and 2 switches, Northern Telecom's Meridian 1 PBX line and Rolm's 9751 switches.

VoiceLock will be available in the first quarter of 1992. Pricing for the system and installation ranges from $29,500 for a two-port VoiceLock to $129,000 for an eight-port unit.

Moscom will initially sell VoiceLock through its direct sales force but plans to market the product through companies that already sell its call accounting and telemanagement products under private-label agreements.

3Com touts performance of new RISC-based bridge/router, hub

By Maureen Molloy
Staff Writer

SANTA CLARA, Calif. — 3Com Corp. last week unveiled what it labeled the industry's first RISC-plus-ASIC multiprotocol bridge/routers as well as a new intelligent wiring hub that supports Ethernet, token-ring and FDDI local-area networks.

3Com's NETBuilder II bridge/routers combine a Reduced Instruction Set Computer (RISC) processor and custom-designed application-specific integrated circuits (ASIC) with an 800M bit/sec backplane to provide the throughput needed for high-speed net interfaces such as Fiber Distributed Data Interface and T-3.

ASIC technology enhances performance by "shrinking" discrete components of the device into a single compact chip.

The new RISC-based hub is the company's third-generation wiring concentrator and delivers so-called scalable bandwidth to the desktop. According to the company, the hub can provide individual users with access to a full 10M bit/sec Ethernet pipe and 100M bit/sec FDDI link as their applications demand.

Todd Dagres, director of data communications research and consulting at The Yankee Group in Boston, said the new products will position 3Com as a major provider of internetworking solutions.

"3Com is clearly now a force to be reckoned with in the internetworking arena," Dagres said. "The company is committed to becoming a market leader, and these new products allow them to jump into the game in a significant way."

NETBuilder II is available in two models: a four-port version that will support two Ethernet and two wide-area connections, and an eight-port version that will support any combination of Ethernet and

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We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication. Call (800) 622-1108 and ask for Ext. 487.

SynOptics' SNMP manager gets FDDI support

By Joanne Cummings
Staff Writer

SANTA CLARA, Calif. — SynOptics Communications, Inc. last week said it has enhanced its SNMP-based LattisNet Manager net management system by adding support for FDDI, as well as new network security, mapping and asset management features.

The addition of Fiber Distributed Data Interface support to SynOptics' LattisNet Manager for Unix Release 2.0 enables a user at a single console to monitor and control Ethernet, token-ring or FDDI local-area networks attached to LattisNet System 3000 intelligent wiring hubs.

Until now, the software only supported Ethernet and token-ring LANs.

LattisNet Manager Release 2.0 is a net management module that runs on a Sun Microsystems, Inc. Unix workstation. The software monitors and controls all devices attached to LattisNet System 3000 hubs, each of which uses a Network Control Engine (NCE) module to monitor and control locally attached devices.

LattisNet Manager Release 2.0 is based on SunNet Manager, an integrated net management system developed by Sun and now available through SunConnect, a Sun business unit in Mountain View, Calif.

According to SynOptics, the addition of FDDI support to the software makes it the first product to provide fully integrated control over FDDI, Ethernet and token-ring networks.

"The fact that this product manages all three LAN technologies is very important," said Charles Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston. "This is a real step forward."

Wide-reaching control

As with the previous version, users at the central management workstation, which must be running the X Window System, can access LattisNet Manager via SunNet Manager's Sun OpenLook graphical user interface. From that workstation, the LattisNet Manager can control any Simple Network Management Protocol-based network device, such as bridges and routers, on any of the three types of networks.

In addition to the integrated LAN support, LattisNet Manager Release 2.0 contains a new Allowed Node security feature, which enables net managers to restrict a node from accessing unauthorized resources, such as a concentrator or a specific data port. If an unauthorized user at-

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Corrections: The address for Phase2 Networks, Inc. was incorrect in a recent article. The correct address is 10801 Regent Circle, Naples, Fla. 33942; (813) 591-2884.

The story "IBM product blitz widens net horizons" (*NW,* Sept. 16) incorrectly implied that IBM's enhanced NetView graphical user interface and Resource Object Data Manager tool would be available in May 1992. IBM will formally announce the products and provide availability dates in May 1992.

The article "Northern Telecom ups DPN-100 support" (*NW,* Sept. 16) provided the wrong price for the DPN-100/1 packet switch. It is $7,200.

Network World regrets the errors.

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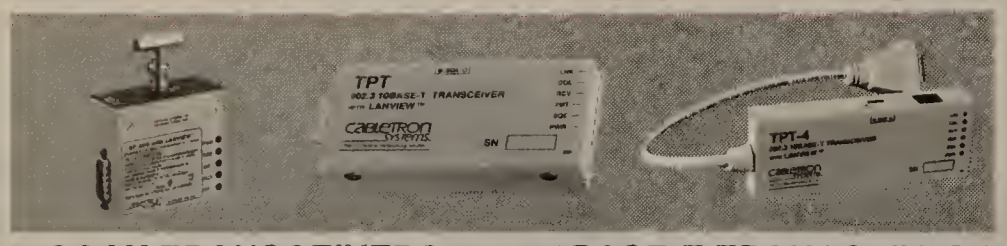

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When ROLM sent John Axselle back to school, he asked questions that got a whole campus talking.

When ROLM® sales rep John Axselle arrived at Virginia Tech, he knew he was in for a lot of homework.

His assignment? Design an integrated voice and data system to link three facilities: the library, the mainframe computer center and a campus-wide system of PCs.

As could be expected of one of America's leading research institutions, the solution began with questions. John asked a lot of them, and, in conjunction with Virginia Tech's Communications Resources Department, was able to uncover the telecommunications needs of the university's entire 28,000 member academic community.

From the multitude of questions came a singular answer. The ROLM 9751, which integrated three separate entities into one powerful learning tool.

Soon, students were able to access library research materials from personal computers in their dorm rooms. Professors and students alike were conducting electronic bull sessions with their counterparts around campus and around the world. And one day, students will be able to take a morning class at the Sorbonne and attend an afternoon lecture at Oxford. All without leaving campus. And all thanks to the ROLM 9751.

Could John Axselle have sold a system without all of his questions? Probably. It's done every day. Could he have helped design a system specifically matched to the campus-wide needs of Virginia Tech? Definitely not. And that's a lesson that shouldn't be lost on you the next time you're considering a telecommunications company.

For more information, call ROLM at 1-800-624-8999 ext. 235, or your authorized ROLM Business Partner.

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Proteon enhances SNA, DEC support on bridge/routers

Adds next-generation FDDI interface for CNX 500.

By Maureen Molloy
Staff Writer

WESTBOROUGH, Mass. — Proteon, Inc. last week unveiled new capabilities that make it easier for users of its Communications Network eXchange (CNX) 500 and p4100+ bridge/routers to merge nonroutable IBM and Digital Equipment Corp. network traffic onto multiprotocol backbone networks.

The company also announced a second-generation Fiber Distributed Data Interface for its CNX 500 router.

To better support DEC network environments, Proteon has implemented the IEEE 802.1d FDDI Translation Bridging standard on the CNX 500, the company's Reduced Instruction Set Computer (RISC)-based bridge/router that is capable of routing 100K packet/sec.

Support for the FDDI standard will enable the CNX 500 to convert Local Area Transport (LAT) and other nonroutable Ethernet traffic into an FDDI format so it can be transported across an FDDI backbone. The product can already bridge and route DECnet local-area network and LAT terminal traffic.

The company has also implemented proprietary DEC token-ring specifications, which will enable Proteon's bridge/routers to carry DECnet Phase IV token-ring traffic over DECnets.

Proteon is the first router vendor to implement the DECnet Phase IV 802.5 Data Link Specification, which defines how DECnet Phase IV traffic runs over token-ring networks.

In addition, Proteon is trying to help users of DECnet Phase IV migrate more easily to the Open Systems Interconnection-based DECnet Phase V. The p4100+ and CNX 500 will provide OSI routing — both End Station to Intermediate System and Integrated Intermediate System to Intermediate System — as well as a transitional gateway that allows users to integrate networks running both DECnet Phase IV and DECnet Phase V/OSI software.

These software upgrades are available immediately and cost between $500 and $750.

Proteon will enable customers to better integrate IBM Systems Network Architecture traffic into

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Lotus proposes API for message-enabled software

By Wayne Eckerson
Senior Editor

CAMBRIDGE, Mass. — Lotus Development Corp. last week said it will soon release application program interface (API) specifications that it will promote as an industry standard for embedding messaging functionality in applications.

Called Open Messaging Interface (OMI), the new specification is being developed in conjunction with IBM and Apple Computer, Inc., which have agreed to support it in current and future offerings across multiple platforms.

OMI will help application developers incorporate features that enable users to send and receive messages without exiting a program. These applications will feed message requests to an underlying mail system that supports the OMI interface.

OMI spares software developers the chore of writing separate versions of message-enabled applications to work with different mail systems. In addition, applications tied to mail systems that support the OMI interface can exchange messages directly without going through a gateway.

Analysts said OMI will be a boon to users that need those capabilities.

Patricia Seybold, president of Patricia Seybold Office Computing Group in Boston, said the OMI specification will be useful to large corporate users that want to link local and enterprisewide messaging systems or develop applications incorporating messaging features.

"OMI provides the API that will make it easier for companies to link their mail systems or develop message-enabled applications," Seybold said.

According to Seybold, leading user companies that are building sophisticated applications on top of electronic messaging systems would benefit immensely from OMI. "OMI means these companies won't have to do so much hard work," she said.

Lotus plans to distribute OMI specifications to third-party and corporate software developers and other parties free of charge at the end of November when documentation is completed.

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MCI to add features, bring new services under INMS

By Anita Taff
Washington Bureau Chief

SAN DIEGO — MCI Communications Corp. last week said it will enhance its Integrated Network Management System (INMS) and expand the range of services supported by the offering.

At the Tele-Communications Association, Inc. conference here last week, MCI also introduced an electronic bill delivery option for small and midsize users participating in its Vision program. The new option promises to cut invoice delivery to users by about a week and provide them with added invoice analysis.

In early 1992, MCI will enable INMS to support its 800 and 900 offerings as well as its three data services — Terrestrial Data Service, Digital Data Network and Digital Private Line. Until now, INMS has been available only for MCI's Vnet virtual net offering.

> "MCI will continue to augment INMS by bringing in new services."
>
> ▲▲▲

The net management and billing announcements help to fulfill MCI's goal of offering multiple levels of customer support and increased integration and features, said Andrea Riedy, acting director of network management billing services for the carrier.

"MCI will continue to augment INMS by bringing in new services and new features," Riedy said. In addition, the carrier is already working to integrate the new INMS features into Focusnet.

MCI will add a number of enhancements to INMS by rolling out a new software release, INMS 2.0, early next year, according to Riedy. Those enhancements include monitoring of digital access and cross-connect systems, as well as enhanced superframe data, the addition of dynamic topology maps that include color-coded status information and broadcast messaging.

MCI will also add new performance and planning manage-

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FCC to develop nationwide policy for caller ID services

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The Federal Communications Commission last week said it will develop a national policy regulating caller identification technologies.

In initiating proceedings to craft regulations for interstate services, the agency proposed that carriers marketing caller ID offer customers the ability to block transmission of telephone numbers on a per-call basis.

But the FCC ruled out per-line blocking for caller ID, saying it "unduly burdens the overall effectiveness of the service."

With automatic number identification (ANI), the FCC tentatively decided to prevent call-blocking entirely.

FCC Common Carrier Bureau Chief Richard Firestone said long-distance carriers generally use the ANI feature as a means of billing calls and "the long-distance call, in theory, could not be made" if ANI were blocked.

Call blocking has been a nettlesome issue in the contentious debate over calling number identification services, which has pitted privacy advocates against proponents of the technology.

The FCC move is likely to arouse the resentment of Congress and state regulatory bodies, which are involved in their own rule-making activities for caller ID and ANI.

Firestone acknowledged the inevitable conflict. "The central question is whether intrastate and interstate models can harmoniously coexist both legally and technologically," he said.

Users praised the FCC effort. Dan Gonos, telecommunications manager at Domino's Pizza, Inc., which uses caller ID and ANI, said a national policy would help the services become ubiquitous.

He said the FCC's proposal to preclude call blocking entirely for ANI was a good one. Domino's has begun implementing ANI in a complex system for order processing and delivery route assignments. "For the routing scheme we're using, it's absolutely critical," Gonos said. "We oppose call blocking because it emasculates the service."

Carriers such as AT&T and the regional Bell holding companies, which stand to benefit from the FCC's new initiative, reacted cautiously, declining to comment until a written order is issued.

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Banyan boosts VINES, adds new control, internet tools

Backs SNMP, enhances support for X.25 and T-1.

By Caryn Gillooly
Senior Editor

LOS ANGELES — Banyan Systems, Inc. introduced a new version of its VINES network operating system last week and a handful of other enhancements designed to improve network management and connectivity.

The announcements, made at Banyan's Association of Banyan Users' International conference here, included product support for the Simple Network Management Protocol (SNMP), a set of management utilities and enhanced support for X.25 and fractional T-1 links.

The new release of VINES Version 4.11 supersedes Version 4.10, which was released last April. The primary benefit of 4.11 is that it supports an enhanced version of VINES SMP, which will enable customers to use AT&T's StarServer E as a VINES server. The StarServer E, released about a month ago, supports as many as four Intel Corp. 80486 microprocessors, up to 4G bytes of internal disk and 256M bytes of memory.

Previous versions of VINES SMP could only support dual processor servers, Compaq Computer Corp.'s SystemPro and Advanced Logic Research, Inc.'s Powerpro.

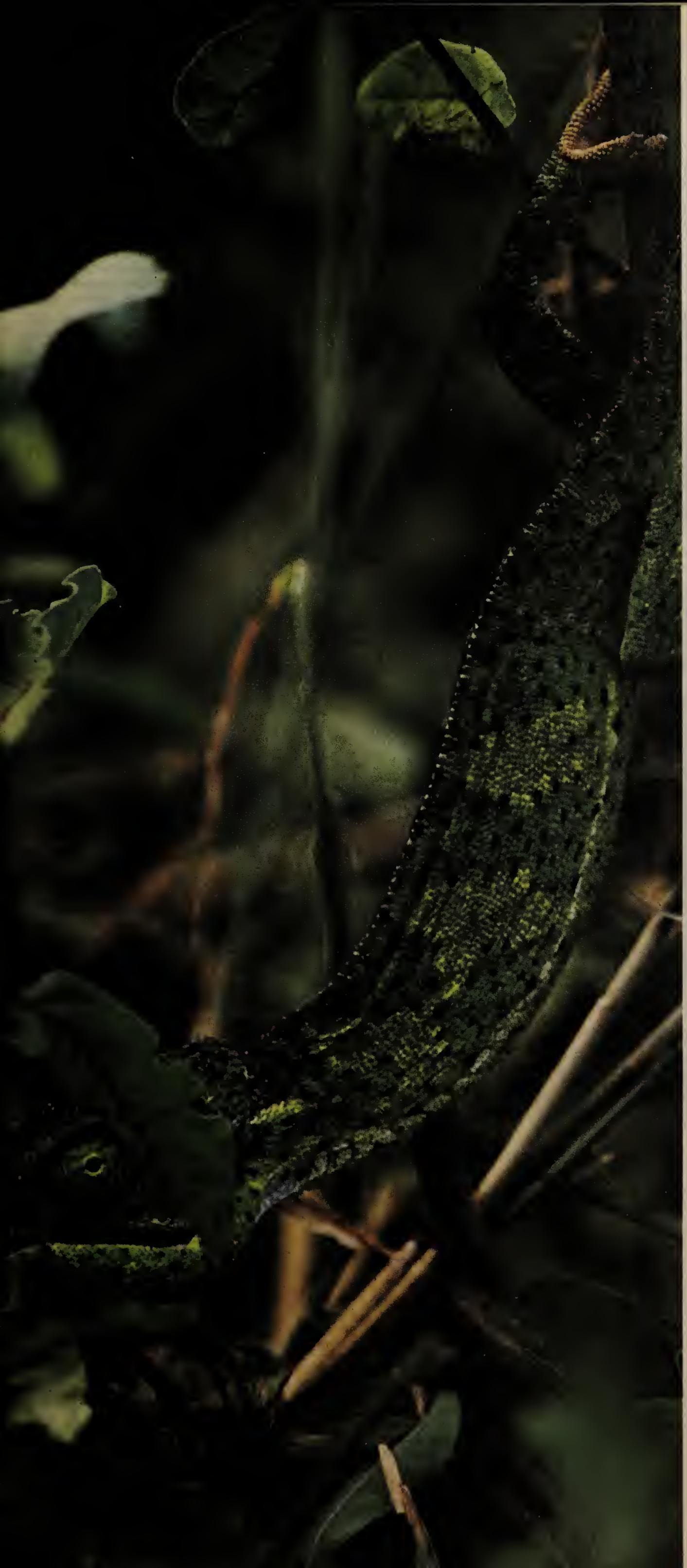
Other enhancements in VINES 4.11 include support for diskless clients, a broader array of local-area network adapters and additional security and management features. The latter features include a new LOGOUT command, which lets administrators log off VINES users, and a remote server reboot capability, which enables administrators to remotely reboot an unattended VINES server.

VINES 4.11 is free to users who carry the VINES Subscription Program; otherwise, it costs $7,495 for an unlimited-user version and $13,995 for VINES SMP. The product will be available in November.

SNMP support

Banyan also announced last week a VINES SNMP Server Agent, which will make it possible to monitor VINES devices and relay that information to a central SNMP management station.

(continued on page 51)



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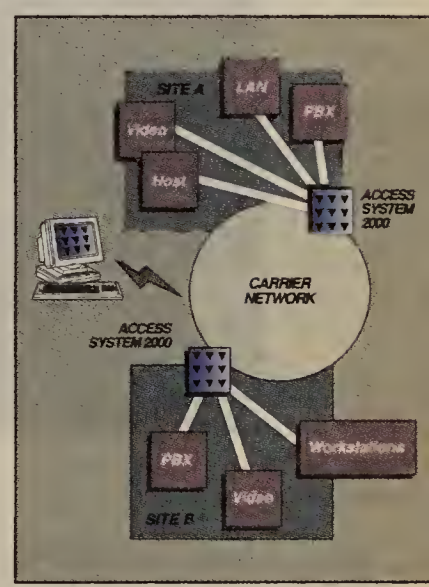

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HP, other vendors back new SNMP RMON standard

By Jim Duffy
Senior Editor

Three vendors last week threw their collective weight behind a new Management Information Base (MIB) standard for monitoring network elements at remote sites via the Simple Network Management Protocol (SNMP).

Hewlett-Packard Co., Frontier Software Development, Inc. and ProTools, Inc. pledged support for the so-called Remote Network Monitoring (RMON) MIB, an SNMP-based collection of network object definitions and attributes developed by the Internet Engineering Task Force.

RMON provides users with more comprehensive fault diagnosis, network planning and performance tuning capabilities than existing SNMP MIBs and remote monitoring agents.

HP developed firmware for its 4991A LanProbe segment monitor and OpenView Probe Manager that supports the RMON MIB. HP, which will demonstrate its RMON-compliant wares at INTEROP 91 Fall next week in San Jose, Calif., said it plans to announce the pricing and availability of that firmware in January.

Frontier has implemented RMON in its Ethernet agent software, which runs on its NetProbe system, as well as on SynOptics Communications, Inc. hubs and Sun Microsystems, Inc. SPARCstations.

ProTools plans to support the RMON MIB in its Network Control Series line of enterprisewide SNMP management agents and consoles, which will be available Oct. 31.

The RMON MIB includes features not found in current MIBs, including additional packet error counters, more flexible historical trend graphing and statistical analysis, an Ethernet-level traffic matrix and more comprehensive alarms.

With products based on current SNMP MIB definitions, "You can't do in-depth diagnostics," said Narendra Popat, president of Frontier. "You usually have to buy a protocol analyzer, which is not part of the management system itself." With the RMON MIB, the management workstation console can perform diagnostics.

RMON is designed to keep statistics on the subnetwork as a whole, according to Jeff Erwin, vice-president of engineering and chief technology officer for ProTools.

Lotus proposes API for software

continued from page 6

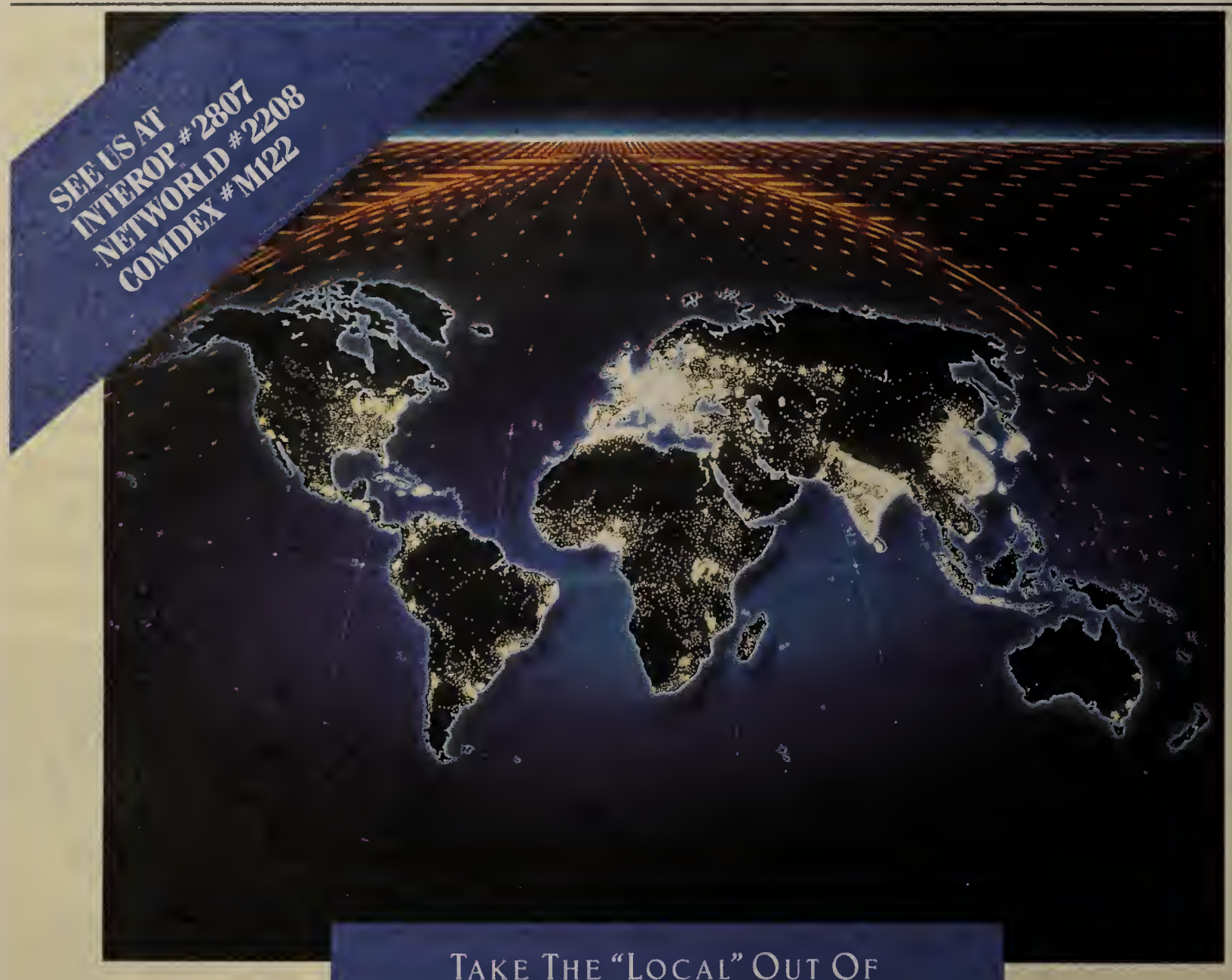
Lotus officials said future versions of cc:Mail, its local-area network messaging system, and Notes, its groupware product, will support OMI. IBM will support OMI in future versions of its OS/2 Extended Edition and OfficeVision/2, and Apple plans to support OMI in future versions of its System 7 operating system for Macintoshes.

The OMI specification includes facilities for creating, addressing, sending, receiving and storing electronic mail messages. Lotus plans to enhance OMI in 1992 to support administration and maintenance services.

Seybold said Lotus will need to provide users with an OMI developers' tool kit to make the integration job easier, but the company has no plans to do that. She also said she hoped Microsoft Corp. would agree to support OMI instead of developing a separate API. "I know Lotus is interested in talking with Microsoft to come up with some kind of agreement," Seybold said.

IBM plans to distribute an OMI developers' kit to application developers, and Lotus plans to hold an OMI developers' conference in December for software vendors and corporate application developers.

To receive a free copy of the OMI specifications, call Ted Real of Lotus at (617) 693-4610.



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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"The only thing that has really stalled the frame relay market is that service providers haven't rolled out the network services. This is a service-constrained market right now."

Rick Malone
Principal
Vertical Systems Group
Dedham, Mass.

People & Positions

Norwalk, Conn.-based **Rolm Co.** last week announced that **Roger Bacon,** formerly vice-president of marketing for Boca Raton, Fla.-based Tel-Plus Communications, Inc., has assumed the newly created position of vice-president of systems management.

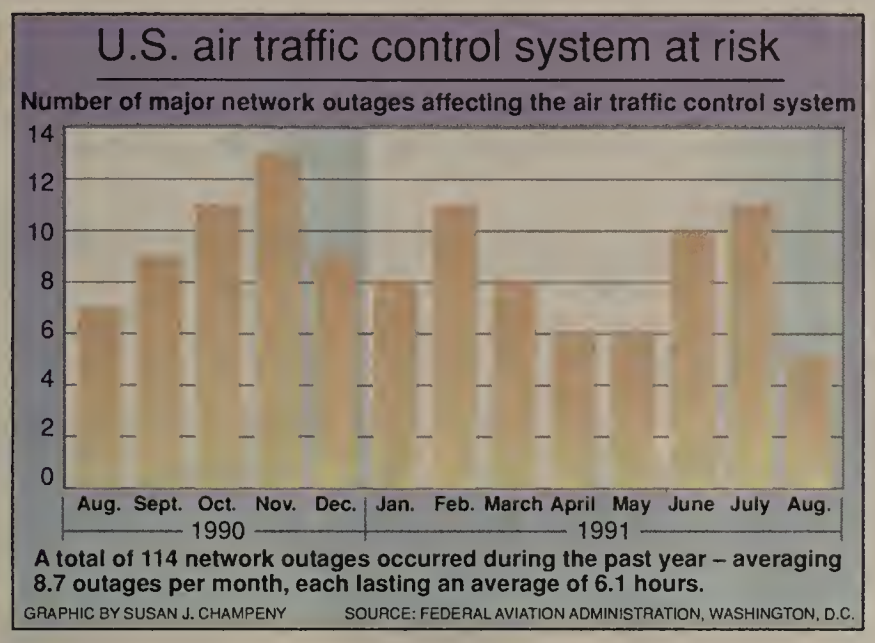
Bacon will have responsibility for the company's strategic direction and competitive analysis. He will also oversee the development of new customer applications.

Gilbert Williamson, formerly president of **NCR Corp.,** has assumed the position of chief executive officer with NCR and has joined AT&T's board of directors as part of the merger agreement between AT&T and NCR. Williamson has also become chairman of the board of NCR.

Elton White, formerly NCR's executive vice-president of marketing, has assumed the position of president and bears responsibility for day-to-day company operations. No one has been named to succeed White as yet.

Former **Nynex Corp.** chairman and chief executive officer **Delbert Staley** announced his retirement from the Nynex board of directors, effective today.

Company founder Staley was the chairman of Nynex from 1983 through 1989.



AT&T outage spurs federal action on reliability issues

Lawmakers call for hearings after New York fallout.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — In the wake of the recent AT&T outage in New York, Rep. Edward Markey (D-Mass.) has called a House Telecommunications and Finance Subcommittee hearing for tomorrow and summoned the carrier to appear.

But AT&T will not be the only carrier facing congressional questioning on net reliability this week. On Wednesday, Rep. Robert Wise (D-W.Va.) plans to probe officials of the regional Bell holding companies and the Federal Communications Commission on the subject before a subcommittee of the House Government Operations Committee.

Markey and Wise plan to jointly introduce legislation establishing reliability standards and a national emergency coordination program, according to aides for the legislators.

The Sept. 17 outage at an AT&T switching station in lower Manhattan disrupted long-distance service and caused the shutdown of the Long Island air traffic control system for seven hours.

During the incident, AT&T issued conflicting explanations. Last week, Robert Allen, the carrier's chairman and chief executive officer, apologized for the confusion. He said the company is still piecing together events and cannot yet explain why automatic rerouting had failed.

As a result of the outage, the air traffic control system has become a high-profile issue on Capitol Hill. The General Services Administration is attempting to force the Federal Aviation Administration (FAA) onto the Federal Telecommunications System 2000 net, instead of permitting the agency to upgrade the air traffic control network through the Leased Interfacility Communications System.

Sen. Ernest Hollings (D-S.C.) and Sen. Alfonse D'Amato (D-N.Y.) said they intend to intervene in that situation if the GSA doesn't back off.

Last week, the House Telecommunications Subcommittee released a report from the FAA detailing 114 local outages on the nationwide net that have affected the nation's air traffic control system during the past year. There have been an average of 8.7 outages per month, lasting an average of 6.1 hours each.

The FAA report enumerated instances where "acts of God" — such as beavers chewing fiber cable or lightning striking — have knocked out facilities from a variety of carriers, including AT&T, Allnet Communications, Inc., the RBHCs and others.

In other cases, the FAA was able to trace the root cause to carrier equipment failures.

Both Markey and Wise have indicated they view network reliability as a regulatory problem as well as a technical one.

In a recent letter to FCC Chairman Alfred Sikes, Markey said the commission seemed "unwilling to meet its obligation to ensure the integrity of the telecommunications network" because it does not gather specific data on common carrier network performance and service quality.

Sikes, who has also been asked to testify at the Markey hearing, last week noted that the FCC recently initiated proceedings to establish new carrier rules for reporting network failures.

However, Sikes expressed confidence that a competitive marketplace would ultimately be the arbiter of network quality. "If we don't like something, we have another choice," he said.

CSC grabs up giant outsource contract

Firm to take over net operations, data processing for General Dynamics in $3 billion, 10-year deal.

By Wayne Eckerson
Senior Editor

ST. LOUIS — In one of the biggest outsourcing deals ever, General Dynamics Corp. last week said it plans to hand over the management of its data processing and network operations to Computer Sciences Corp. (CSC) in a 10-year deal valued at more than $3 billion.

As part of the deal, CSC will purchase $200 million worth of equipment, software, service contracts and facilities from General Dynamics, including three major data centers in Norwich, Conn., Fort Worth, Texas, and San Diego, as well as about 28 smaller processing sites throughout the country.

In addition, 2,600 employees in General Dynamics' Data Systems Division will be offered positions at CSC, leaving the division with about 800 workers.

"This is more of a divestiture than outsourcing," said Ken Wang, director of systems integration at General Dynamics here. "We are simply getting out of the [information technology] business."

Wang said CSC will manage data processing operations for General Dynamics' aerospace and defense units, as well as the firm's nationwide voice, data and video network, which consists of a T-1 backbone connecting numerous lower speed regional nets. CSC will also take over responsibility for application development, end-user computing support and management of local-area networks.

Wang and other General Dynamics officials declined to say how much the contract would save the company, which posted $10 billion in sales last year, but they said cost-cutting was a major factor behind the decision. The move dovetails with a downsizing effort initiated last year that has reduced staffing from 102,000 to 85,000 employees.

General Dynamics' revenues from 1989 to 1990 remained relatively flat, although the company was part of the corsortium headed by Lockheed Corp. that recently won a U.S. Air Force contract that is expected to be worth billions of dollars.

The outsourcing deal also relieves General Dynamics of hav-

(continued on page 47)

INDUSTRY BRIEFS

Telematics negotiates possible merger. Fort Lauderdale, Fla.-based Telematics International, Inc. announced it is it engaged in negotiations with Dallas-based Harris Adacom Corp. regarding a possible merger.

Telematics would issue about 23.1 million shares of its common stock in exchange for all of Harris Adacom's capital stock and vested stock options. Telematics said there is no assurance the negotitations will result in an agreement.

In a separate action, Telematics announced that revenue for the third quarter ending today is expected to be somewhat lower than the reported revenues for the second quarter ended June 30. The company said it will report its actual third-quarter results during the week of Oct. 21.

Carrier bans all information services. Sprint Telemedia, a US Telecom, Inc. unit that resells US Sprint Communications Co. long-distance services, last week announced it will no longer provide billing and collection for information service providers using 900 numbers to market their services. The company, which halted billing and collection services to romance, credit card and job lines last July, said the new ban now extends to all information services providers.

Sprint Telemedia said it has been notified by the U.S. Attorney's Office in Des Moines, Iowa, that the agency is preparing an indictment on several fraud-related charges against an information service provider that ran a credit card business.

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Worth Noting

Mitel, Inc. and MCI Communications Corp. last week announced a sales agency program under which Mitel distributors will sell MCI network services, including MCI Vision, MCI 800 and MCI Card.

Carrier Watch

Pacific Bell and **Northern Telecom, Inc.** last week announced they will team up to provide network services for California State University at San Marcos, a new facility.

The heart of the system will be a Northern Telecom S/DMS SuperNode central office switch and several fiber-optic remote S/DMS AccessNode modules. The university network will support voice, data and video traffic.

The S/DMS SuperNode will become part of Pacific Bell's public net. The Bell operating company has not determined if the switch will be located on or off campus or if it will be used to provide service to corporate users.

Pacific Bell and Northern Telecom will assist the school in developing telecommunications curricula. In addition, California State will work with the vendors to develop intern programs to provide technology transfer and information exchange between industry and academia.

Pacific Bell and Northern Telecom will provide a research project team to assist the university in developing applications that can be tested, evaluated and deployed in the education market.

California State will use Pacific Bell's voice mail service, and the BOC will be the service provider for an automated push-button telephone registration system at the school.

Northern Telecom will provide four DV-45 video coder/decoders and as many as 200 Integrated Services Digital Network telephone sets at no cost to the university.

FCC maintains stance on ban of 800 in Tariff 12

Sources contend some users may get waivers.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The FCC recently released the official text of its order on AT&T's market status, holding firm on its plan to bar new Tariff 12 deals that include 800 service but leaving open the possibility that users could apply for waivers to get around the restriction.

After examining the issue of AT&T's dominance in the long-distance market, the Federal Communications Commission on Aug. 1 relaxed a number of rules regulating the long-distance carrier. But citing AT&T's 80% share of the 800 service market, the FCC voted to bar the carrier from offering 800 service in new Tariff 12 deals.

The order apparently invalidates 15 Tariff 12 deals — all of which call for provision of 800 service — that AT&T filed after Aug. 1. Although FCC staff members had said earlier that the agency would not accept new Tariff 12 filings containing 800 service after that date, AT&T continued to file the deals, saying it believed the decision was not official until the text of the order was released ("FCC decisions shake up network industry," *NW*, Aug. 5).

There are several options for users whose tariff filings didn't make it by deadline. They could refile a deal without 800 service or purchase an existing Tariff 12 deal.

According to an FCC source, there is also a third option that involves applying for a waiver, known as a special permission. Almost any rule that the FCC has voted on can be waived for good cause, according to sources.

Attorneys representing users with Tariff 12 deals complained that some users may have put as much as a year of work into negotiating the deals and shouldn't be penalized by not getting service just because they missed a paperwork deadline. That type of argument could be enough to get a special permission.

However, the FCC order does

(continued on page 16)

WASHINGTON UPDATE

BY ELLEN MESSMER

AT&T's share of long-distance mart slips. The Federal Communications Commission released a report last week, "Long Distance Market Shares: Second Quarter, 1991," showing AT&T's share of interstate switched-access minutes dropping from 63.2% in the first quarter to 61.8% in the second quarter. Despite this drop, AT&T actually carried more traffic in the second quarter — 50.5 billion minutes of interstate switched traffic vs. 49.9 billion minutes in the first quarter. But the total interstate switched-access market grew from 79 billion minutes in the first quarter to 81.7 billion minutes in the second.

Capability added to AT&T's SDDN. AT&T is adding Virtual On-Network capability to its Software-Defined Data Network (SDDN), according to a Federal Communications Commission tariff filing scheduled to become effective Oct. 4. The Virtual On-Network capability allows SDDN customers to communicate with off-net sites that use AT&T's Switched Digital Services.

Senate votes down spectrum-auctioning bill. The U.S. Senate last week rejected a proposal put forward by Sen. Robert Dole (R-Kan.) that included spectrum auctioning as a means for funding the $6 billion Emergency Unemployment Compensation Bill. Dole said President Bush would have been willing to approve the unemployment bill if Congress gave legislative approval to allow the government to auction off spectrum to the highest bidder. But the Senate rejected the spectrum-auctioning measure by a vote of 57 to 42, with most Republicans backing the Dole proposal and most Democrats voting against it.

Metropolitan Fiber Systems, Inc. profile

Headquarters: Oakbrook Terrace, Ill.
Founded: January 1988
Chief executive officer: Royce Holland

Local telecommunications services:

- Special access (connecting long-haul carrier points of presence)
- Carrier-to-carrier trunking lines
- Intracity private lines

Networks in:

- Baltimore
- Boston
- Chicago
- Dallas
- Houston
- Los Angeles
- Minneapolis
- New York
- Philadelphia
- Pittsburgh
- San Francisco

Network pending in: Washington, D.C.

GRAPHIC BY SUSAN J. CHAMPENY

MFS chief discusses maturation of firm

Royce Holland says the carrier is evaluating eight new markets, may someday offer Centrex service.

Q&A The regional Bell holding companies probably wish Metropolitan Fiber Systems, Inc. (MFS) President and Chief Executive Officer Royce Holland had stuck with his boyhood dream of following Hall of Fame pitcher Sandy Koufax to the major leagues. But Holland's fastball was about 45 miles per hour too slow.

Today, Holland heads up an alternative access carrier that operates fiber optic-based bypass networks in 11 cities. He discussed the evolution of MFS, its plans for the future and the challenges it will face with *Network World* Senior Editor Bob Wallace.

How has MFS evolved?

MFS was founded in January 1988 with the intention of building three networks. Over the next 12 to 14 months, we acquired Chicago Fiber Optic's network and built our own in Philadelphia and Baltimore.

Not long after, we decided that this was really a nationwide business, not a regional business or a three-city business. In order to provide the type of services that would be of interest and value to large business customers and interexchange carriers, we had to have a nationwide presence.

In 1989 alone, we turned up service in five cities. Since then, we added three more networks — Pittsburgh, Dallas and New York — and acquired a network in Washington, D.C.

Does MFS plan to offer service in any other cities?

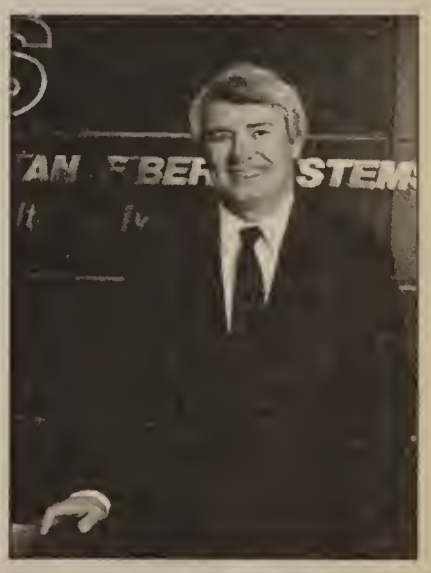
We are in some stage of investigating putting networks in Atlanta, Miami, New Orleans, Cleveland, Indianapolis, Denver and Seattle.

I wouldn't say these are definitely the next cities, but we are presently doing market assessment, preliminary engineering and analyzing regulatory climates in these cities.

We think that once we get a final order from the FCC in favor of local interconnection and the opening of switched access business to competition, this business will be viable in about 50 cities.

What would it cost to build networks in all those cities?

Several hundred million dollars.



Royce Holland

We've seen MFS roll out net reconfiguration and monitoring as well as local-area network interconnection services in the past year. What drives the development of these new offerings?

The impetus for the development of the LAN interconnection services came from a small group of large users in Houston.

But we feel there will be a big demand for those services in most other cities.

(continued on page 12)

MFS chief discusses maturation of firm

continued from page 11

Demand for network reconfiguration and monitoring services was driven by one major customer in Chicago, Sector, the telecom arm of the Securities Industry Automation Corp.

We provide a number of circuits for Sector in five or six cities. The circuits connect traders and brokers to the exchanges. Sector had a real need to do dynamic reconfiguration of its nationwide net for disaster recovery.

We introduced network reconfiguration and monitoring service for Sector in Chicago and have since introduced it in several other cities. The service was totally driven by one customer requirement.

With the LAN interconnection services launched, what's next?

Right now, we are looking at the Centrex market. If we do choose to get into that market, we would offer Centrex services in competition with the RBHCs. It appears there is enough market for competitive Centrex in several markets.

There are two markets that definitely are attractive — New York and Boston. In both areas, the states have very favorable regulatory climates. They are also large markets. We think there is a lot of potential here.

We would have to invest in [central office] switches or obtain them through ventures with other companies.

How would you compete with the RBHCs for Centrex customers?

I would think we would compete both on price and on quality of service.

But what about customer-specific contracts under which the RBHCs offer low off-tariff pricing? Could you still get down under those prices?

We're still taking a look at this. Those are obviously things we've got to assess.

What are the top two reasons users buy alternative access services?

The top two would be reliability and responsiveness. Our network reliability is in excess of 99.99%, which is far superior to the public switched network. A component reliability is the average time to repair a malfunctioning circuit. Our average is slightly over one hour as opposed to four to six hours for most of the RBHCs.

We also hold an edge in responsiveness. For buildings [currently supported by our networks], we can guarantee an installation interval of five to 15 calendar days after receipt of an order for a new customer. The RBHCs tend to be in the 60- to 90-day range, although we have seen a few installing fiber and quoting intervals near our own. For an existing customer, we can often turn on service within hours after receipt of order.

Why do you say the RBHCs are slow to react to the marketplace and to implement new technologies?

Without question, they are not good at responding to customer requirements for things like new services and custom network solutions. The RBHCs do everything the way they have for the last 100 years. What they decide on has to fit their existing way of doing business.

They have a very large bureaucracy where any new product or service they bring out goes through dozens of review cycles with everyone from the engineering branch to the operations branch to the tariff branch to the legal branch.

That compartmentalized mentality makes it difficult for them to move swiftly in reaction to the market. We absolutely abhor bureaucracy and compartmentalization. We try to promote teamwork among all the employees.

The way we developed the LAN interconnection product was by putting together a team of sales, marketing, engineering and operations people in order to get the job done.

Is that the way you approach any new service?

Yes. We attack problems in a project-oriented multidisciplined task force approach, which is very different than the way things have traditionally been done in the telecom business. It's a tremendous advantage that we have. It's a way of cutting across bureaucracy and bringing the proper talent to bear to solve a problem in the most cost-effective, responsive and timely manner.

What chunk of your revenues come from special access, carrier trunking lines and private lines?

Around 50% to 55% of our business comes from special access — connecting end users to carrier [points of presence] — about 40% to 45% is carrier-to-carrier trunking lines, and less than 5% is from intracity private lines.

Do you see this mix changing over the next six to 12 months?

We expect our LAN interconnection services to be the fastest growing segment of our business in terms of revenues. We see our carrier trunking business shrinking with all the mergers and consolidations in the long-distance industry. Special access will continue to be a big part of our business.

Is MFS profitable?

We will be at the break-even point in the fourth quarter of this year. We should hit profitability sometime in 1992.

User's

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

Despite a myriad of legislative efforts aimed at curbing junk faxing, 85% of 180 users recently surveyed by BIS Strategic Decisions of Norwell, Mass., said getting junk faxes was not a problem in their company. A third of the respondents had never received a junk fax, and only 4% claimed they received more than 20 pieces per week.

Data Packets

BT North America, Inc. last week announced new software for linking personal computers into the company's X.400 based electronic mail service, Mail400. The new software, called UpFront400, costs $150. It includes an improved user interface for Mail400 that enables users to simplify X.400 addresses.

The offering also has modules that enable users to automatically log on to Mail400 nodes worldwide.

At the INTEROP 91 Fall show next week, **General DataComm, Inc. (GDC)** will announce that it is reselling two CrossComm Corp. ILAN bridge/router products as the LAN Transport Management System (LAN*TMS).

The announcement will represent GDC's first foray into the router market.

The LAN*TMS products support Ethernet and token-ring local-area networks and contain a Synchronous Data Link Control encapsulation feature that supports traffic from devices such as IBM cluster controllers.

The Model 100 supports two LAN interfaces and costs between $4,600 and $8,500. The Model 200 supports as many as four interface boards. It costs between $6,000 and $15,000.

Women's clothier dresses up net with frame relay

Tests BT's service to support image transfer.

By Paul Desmond
Senior Editor

SAN FRANCISCO — Byer California, a maker of womens' clothing, is counting on frame relay to give it a leg up on the competition by enabling it to ship images of its latest designs to buyers at showrooms nationwide.

Byer California is a beta user of BT North America, Inc.'s public frame relay service, the availability of which was announced at last week's Tele-Communications Association, Inc. annual conference in San Diego.

The company has been testing the service between its headquarters here and a showroom in New York since mid-July and plans to add support for six other showrooms by the end of next month.

Michael Higgins, technical support manager for Byer California, said the company is installing the frame relay links to replace BT North America's XLINK Express X.25 service.

The 19.2K bit/sec XLINK service is used to connect routers at remote sites to a series of Sequent Computer Systems, Inc. minicomputers at the clothing manufacturer's headquarters. The routers are attached to Ethernet local-area networks supporting terminal servers.

"For terminal and printer traffic, that [configuration] was more than sufficient," Higgins said. But the company had identified a need to support transmission of 4M-byte image files for which it needed the 56K bit/sec capacity offered with the frame relay service. X.25 is geared for small packet sizes and has more error-checking overhead, both of which make it inefficient for handling such large files, he added.

Byer California also viewed frame relay as a technology that would better position it to handle future bandwidth-intensive applications, Higgins said.

The image transfer capability promises to give the company a competitive edge by helping it get new designs to buyers faster.

"If it's near the end of the fall season and we come across an idea for an excellent fall garment, it may be several weeks before we can get enough of that garment produced [to ship to showrooms]," Higgins said. With the image transfer capability, the company can send pictures of a garment as soon as a single piece is complete, and buyers can place the orders before it's too late in the season.

"It's very likely we will have

(continued on page 17)

Unix International backs use of OSF technologies

By Jim Duffy
Senior Editor

BOSTON — Unix International, Inc. (UI) fleshed out its distributed computing initiative with the recent announcement of the current and future technologies it will endorse for use in the program, including some components from rival Open Software Foundation, Inc. (OSF).

The UI Atlas framework, which was announced in January, is characterized as an open computing environment designed to foster the development of distributed applications through the use of standard application program interfaces (API).

Through the use of its new architecture, UI claims that one interface specification will allow multiple system elements across an enterprise information system to appear as a seamless environment.

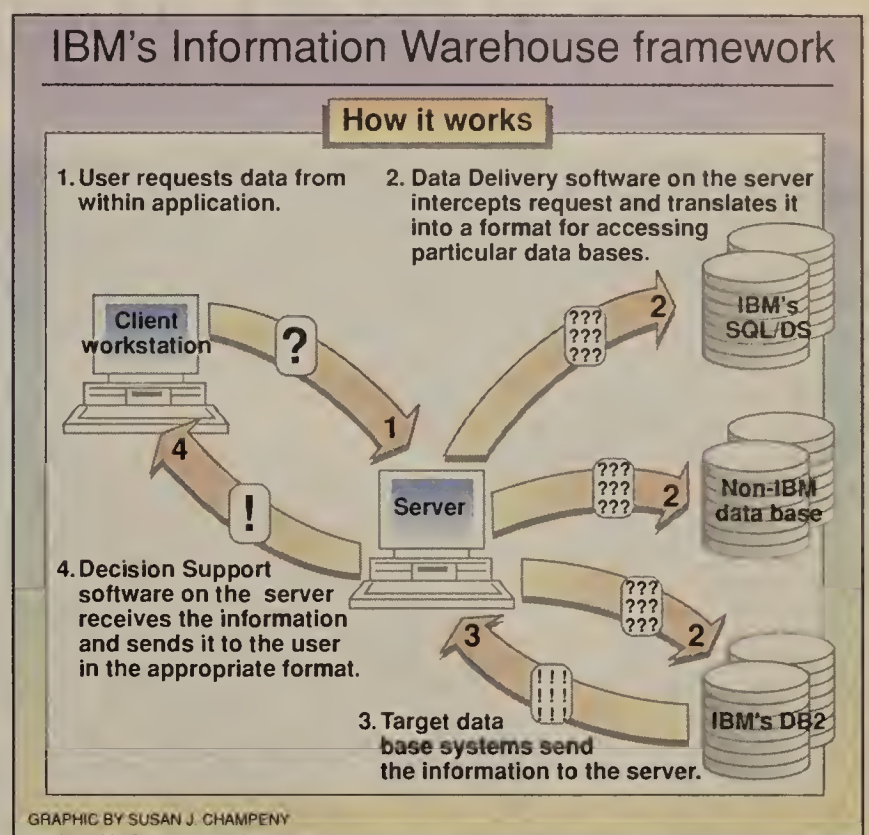
The company also maintains that UI Atlas will encourage development of competing — yet compatible — products, enabling users to take advantage of cost competition and innovation in an open market.

UI Atlas will incorporate the OSF's Distributed Computing Environment (DCE) to achieve interoperability among disparate products. Though UI Atlas and DCE are structured to achieve the same purpose, they are not positioned to compete with one another, according to a UI spokesman.

According to UI, DCE is not as comprehensive as UI Atlas. "DCE is one level, one section of UI Atlas, which is a more global view of computing," the spokesman said.

In addition to specifying DCE as the "fundamental technologies for interoperability" for UI Atlas, UI also mandates use of specific operating systems, trans-

(continued on page 17)



Users guarded on IBM Info Warehouse

IS execs are happy Big Blue has offered a plan for seamless data access, but questions remain.

By Joanne Cummings
Staff Writer

NEW YORK — Users and analysts last week expressed cautious optimism about IBM's Information Warehouse framework, which outlines how IBM will provide end users with access to IBM and non-IBM data bases across an enterprisewide network.

Providing end users with access to information throughout the organization is a high priority for most information systems executives, who welcomed IBM's decision to lay out its distributed data base management system vision with the recent Information Warehouse announcement. But they questioned some of the technical choices embodied in the framework and how useful the approach will be for most companies.

"IBM's Warehouse concept is key to leveraging information technology," said Vincent Lombardo, MIS director at The Travelers Corp. in Hartford, Conn. "But they need to focus more on total ease of use."

Lombardo said users will need to devote significant resources to actually provide the data base connectivity spelled out in IBM's framework. And in today's tight economy, he added, that's too expensive a proposition.

"Years ago, you could afford it," Lombardo said. "[Now] getting information quickly, easily and inexpensively is key."

IBM's Jim Gideon, a senior program administrator for data bases in Atlanta, acknowledged that customers will need to put some time and effort into building and customizing an Information Warehouse that satisfies their needs. "Ease of use is the whole idea behind the Information Warehouse," he said.

Gideon noted that providing access to data using the tools in the framework will be easier for users than going without them.

IBM's Information Warehouse has three major elements: Decision Support, Data Delivery and Enterprise Data ("IBM product blitz widens net horizons," *NW*, Sept. 16). These elements define the products, file formats, data base calls, information transport and security mechanisms involved in bringing information from a data base anywhere on an enterprise network to end users that have requested it (see graphic, this page).

The cornerstone of the framework is IBM's Distributed Relational Database Architecture (DRDA). DRDA is a published architecture for providing SQL access to remote data residing in IBM relational data bases such as DB2, SQL/DS, OS/400 and OS/2 Extended Edition Database Manager as well as access to non-IBM relational data bases that support DRDA.

"It's important that IBM has endorsed connectivity to a wide variety of data bases," said Richard Finkelstein, president of Performance Computing, Inc., a data

(continued on page 16)

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Worth Noting

"Twisted-pair FDDI is a technology with a bright future, but vendors will have to wait for the resolution of technical changes [such as FDDI over voice-grade unshielded twisted pair], the availability of standards and increased demand for FDDI bandwidth before substantial market demand materializes."

Lee Doyle
Analyst
International Data Corp.
Framingham, Mass.

Netnotes

Codenoll Technology Corp. last week rolled out the CodeNet 8350, 8351 and 8352 10M bit/sec fiber-optic Ethernet adapters for the Apple Computer, Inc. Macintosh. The company also said it will be developing a 100M bit/sec net adapter for the Macintosh, which is scheduled to be available next year.

"Our goal is to provide fiber-optic LAN components for all popular personal computer products," said Michael Coden, president of the Yonkers, N.Y.-based company.

The new adapters support Apple's AppleShare and A/UX version of Unix, Novell, Inc.'s NetWare for Macintosh, 3Com Corp.'s 3+ and 3+Open for Macintosh, the Transmission Control Protocol/Internet Protocol and Sun Microsystems, Inc.'s Network File System. The cards also support Apple's Phase 2 routing services. This will let administrators implement a fiber-optic Ethernet backbone with multiple EtherTalk, TokenTalk or LocalTalk subnetworks.

The CodeNet 8350 and 8351 are priced at $895, while the CodeNet 8352 costs $995. All cards are available now.

LAN operating system evaluation

Criteria	Importance rating (Least 1 – Most 10)
Applications	8.2
Speed	8.0
Remote administration	7.8
Price	7.7
Mainframe connectivity	7.4
Global naming	6.6
Tools	6.2
Multiprocessor support	6.1
Unix support	5.4
Macintosh support	5.2
OS/2 support	5.1

Based on 100 responses of U.S.-based network administrators.

GRAPHIC BY TERRI MITCHELL SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Netronix bridges employ IBM Token-Ring chipset

Offerings promise high throughput at low cost.

By Joanne Cummings
Staff Writer

PETALUMA, Calif. — Netronix, Inc. last week unveiled two IBM-compatible token-ring bridges, the first non-IBM bridges to incorporate IBM's Token-Ring chipset.

By utilizing the IBM chipset, rather than Texas Instruments, Inc.'s token-ring chipset, the Netronix bridges can provide twice the throughput of similar offerings at a significantly lower cost, the company said.

The TokenMaster 2000 and 4000 bridges can forward up to 4K packet/sec.

▲▲▲

The TokenMaster 2000 and 4000 bridges are stand-alone devices that can forward up to 4K packet/sec. They utilize IBM's Source Routing protocol, so they can work with token-ring networks of unlimited size without suffering delays in throughput, according to Bill Rosenberger, president of Netronix.

Both bridges feature an LCD and keypad to enable configuration and status monitoring directly from the bridge.

The TokenMaster 2000 is a local token-ring bridge used for linking two 4M or 16M bit/sec IBM Token-Ring Networks. Users can configure the bridge by using the attached keypad to scroll through TokenMaster's password-protected menus. This obviates the need to configure the TokenMaster 2000 from a personal computer or workstation, which may not be located near the bridge.

TokenMaster 2000 supports Microsoft Corp.'s OS/2 LAN Manager and is expected to be field-upgradable to the emerging IEEE Source Routing Transparent standard by January 1992. Rosenberger said the upgrade will cost between $1,500 and $1,600.

The TokenMaster 2000 costs $4,690 and is shipping now.

The TokenMaster 4000 is a remote bridge that provides the same capabilities as the TokenMaster 2000. It supports line speeds from 9.6K to 2.048M bit/sec as well as 3-to-1 data compression.

The TokenMaster 4000 is expected to be available on Nov. 1 for $5,890.

In conjunction with the new bridges, Netronix also announced a 30-day free trial for the products called the Netronix $1,000 Testing Challenge.

"We are encouraging our users to try our bridges free of charge for one month," Rosenberger explained. "If they can find a more IBM-compatible bridge than the TokenMaster series, we'll send them a check for $1,000."

For more information about the products, contact Netronix at 1372 N. McDowell Blvd., Petaluma, Calif. 94954, or call (707) 769-3300. Users interested in the testing challenge can call (800) 282-2535.

Raylan offers PC LAN interfaces for fiber

Company says the new boards will compete in price with high-end 10Base-T LAN products.

By Caryn Gillooly
Senior Editor

MENLO PARK, Calif. — Raylan Corp. is expected this week to introduce fiber-optic local-area network interface products for personal computers and network management enhancements for its existing line of LAN concentrators.

With these announcements, Raylan, a provider of fiber-optic network products, hopes to bring fiber LAN products more in line with the cost of offerings supporting unshielded twisted-pair wire.

"We see fiber emerging as the media of choice for new cable, and with this [announcement], we'll be offering standard-compliant fiber-optic products at half the price of other fiber products," said D'Arcy Roche, president and chief executive officer of Raylan, based here. "The only question left is, why not pull fiber instead of [unshielded twisted pair] if you're pulling new cable?"

To top off the new product list, Raylan is expected to release fiber-optic-based Ethernet and token-ring network interface cards through agreements with Standard Microsystems Corp. and Racore Computer Products, Inc., respectively.

The Ethernet card — called the Network Series Ethernet NIC — is being developed by Standard Microsystems but sold by Raylan. It will be a 16-bit card compliant with the Industry Standard Architecture (ISA) and priced at $495.

According to the firm, this price is $200 less than the nearest priced 16-bit, ISA-compatible fiber network interface card (NIC) currently sold in the U.S.

"Raylan is introducing [this Ethernet card] at a cost competitive with the upper end of the unshielded twisted-pair Ethernet NIC prices," Roche said.

The new token-ring interface, the Network Series 16-TR NIC, which is also a 16-bit, ISA-compliant card, is being developed by Racore but will be sold by Raylan. The price of the token-ring card will be $895.

Raylan is expected to boost the management capabilities of its existing line of Ethernet and token-ring fiber-optic wiring concentrators by adding support for the Simple Network

(continued on page 16)

HP unwraps two low-end 10Base-T Ethernet entries

By Caryn Gillooly
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. last week bolstered the low end of its local-area network product line with the introduction of two low-cost 10Base-T Ethernet over unshielded twisted-pair wire products.

The company also announced a new line of 10Base-T personal computer interface cards supporting the latest versions of Microsoft Corp.'s and Novell, Inc.'s network operating systems.

The 10Base-T products include the EtherTwist Hub/8 and the EtherTwist 10:10 LAN Bridge LB. The Hub/8 is an eight-port, 10M bit/sec Ethernet multiport hub for connecting personal computers with unshielded twisted-pair wiring. It costs $725.

The HP EtherTwist 10:10 LAN Bridge LB is a two-port, Ethernet-to-Ethernet bridge and a low-end product that is designed to connect work group LANs within a single enterprise environment.

The EtherTwist 10:10 LAN Bridge has filtering capabilities, making it possible to contain traffic on individual LAN segments, as well as self-configuration capabilities, but it does not have the more advanced management capabilities of many other bridges.

For example, the bridge does not have a Simple Network Management Protocol (SNMP) agent. Therefore, it cannot be controlled by any SNMP-based central management console.

"Many customers need a simple, reliable bridge that can just provide segmentation [of existing networks]," said Alan Housley, product marketing manager for HP's EtherTwist networking products. "Therefore, we stripped out the network management to make it less expensive."

(continued on page 47)

FCC maintains ban of 800 in Tariff 12

continued from page 11

not specifically address the possibility of granting waivers. In the order, the agency officially states that it does not want to establish a standard for measuring which contract negotiations are far enough along to warrant exemptions from the Aug. 1 cutoff.

Still, some within and outside the FCC say the commission may entertain a limited number of waiver requests.

The order last week also spelled out the rules under which AT&T can offer service through contracts — another decision reached on Aug. 1. AT&T can individually negotiate contracts for one or more services at special rates, terms and conditions as long as the deals are made available to any customer requesting them. AT&T must file a synopsis of the contract with the FCC at least 14 days before it takes effect.

However, the FCC barred AT&T from offering 800 service in contracts. Until the order was issued last week, some had held out hope that users would be allowed to purchase a contract exclusively for 800.

The FCC's concerns seemed to have been focused on keeping AT&T from bundling 800 service with other offerings, rather than on restricting the carrier from cutting special deals for 800 users.

The agency said it will not allow contract deals for services that are still fully regulated as they had been, which includes 800, international and operator services. AT&T will be permitted to begin offering 800 service in Tariff 12 deals or contracts after the technology is in place to permit users to switch carriers and retain their 800 numbers. That is expected to occur within 18 months.

Services eligible for inclusion in contracts include ProAmerica, WATS, Megacom, Software-Defined Network, other switched services and private-line offerings, excluding analog private lines. Those services were also removed from price cap regulation in the order.

Raylan offers LAN interfaces for fiber

continued from page 15

Management Protocol (SNMP).

Incorporating support of an SNMP Management Information Base I agent in the products will enable administrators to collect information previously unavailable, such as number of packets sent and number of collisions, and make it possible to manage the concentrators from any SNMP-based management station.

Other new management capabilities include port mapping, which will let administrators identify the address of each device attached to a Raylan concentrator. It will also enable users to monitor the status of individual cards connected to a concentrator and determine if the cards are linked to fiber or unshielded twisted-pair cabling.

The SNMP agent will reside on either an Ethernet or token-ring network management interface card that can be installed in any concentrator slot.

In addition, the company will introduce a 10Base-T interface for its existing Ethernet concentrator. With the new card, users will be able to bring 10Base-T nodes into a fiber-optic network environment.

Finally, Raylan plans to unveil enhanced versions of its Ethernet and token-ring transceivers that include LEDs to help network managers isolate errors.

The token-ring NIC, called the Network Series 16-TR NIC, will be available by the end of this year, while the Network Series Ethernet NIC will be available in mid-January. The new token-ring and Ethernet diagnostic transceivers will be available in December for $295, and the new 10Base-T card will ship in January for $255.

The network management cards, expected to be available by year end, will be priced at $1,195 for the Ethernet version and $1,495 for the token-ring version. The upgraded Network Series Ethernet and token-ring concentrators supporting the new cards will also be available by the end of the year for $695.

Users guarded on IBM Info Warehouse

continued from page 13

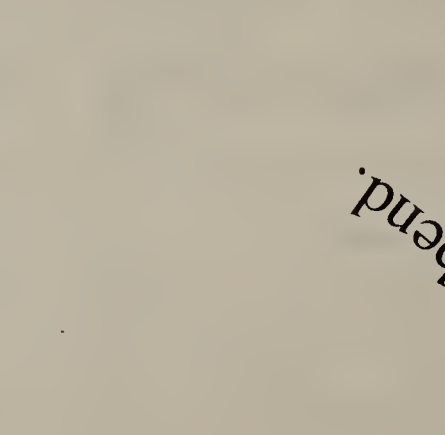
base consulting firm in Chicago. "This gives the user some guidance on how to go about providing heterogeneous connectivity. But I am always a little skeptical of products that claim to have such a wide variety of connectivity."

Finkelstein explained that such wide connectivity usually results in a compromise in functionality and performance. As an example, he pointed out that using SQL as the data base access method will not provide the same level of performance as customized or vendor-specific data base access methods.

Jack Cooper, chief information officer at Joseph E. Seagrams & Sons, Inc. in New York, agreed. "You get enormous performance out of systems today with SQL, but the sophistication of the applications has skyrocketed," he said. "What we're visualizing and designing are very complex systems, and [SQL's] performance has constantly lagged."

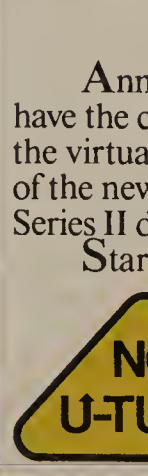
IBM's Gideon countered that the Information Warehouse is designed primarily as a means for giving end users access to data, not as the basis for large-scale production applications. "Performance is always a concern," he said. "[End-user access] needs to be time-sensitive but not in terms of transactions per second. And I think SQL will handle that."

A paper path like this can send reliability around the bend.

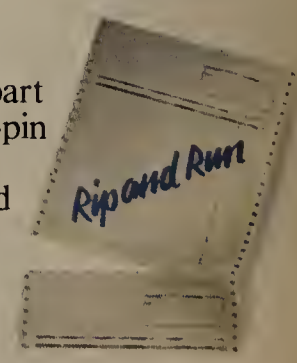


Announcing a design so reliable, it'll have the competition running in circles: the virtually straight paper path of the new IBM Personal Printer Series II dot matrix printers.

Starting with a simpler, no-U-turn paper path, they're engineered from the inside out for smooth, worry-free paper handling.



Four-part forms glide through PPS II 24-pin models easily. Even six-part forms can't faze the 9-pin models. Labels and thick paper stocks feed straight and true, too.



You get front, bottom and rear paper paths, designed for easy loading. And tractors that switch from pull to push in seconds, for rip-and-run efficiency.

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THE STRAIGHT-PAPER-PATH,

Finkelstein also questioned the fact that the framework, as it stands now, only allows users to access data across an enterprise; it does not allow them to update multiple, distributed data bases.

"The capabilities are so limited that I question whether companies are going to be able to make substantial use of them today," he said.

But Gideon explained, "A customer's first reaction is to want update capability, not just read-only. But I think when they put things in perspective, they'll realize that they don't want [end users] to update the data anyway."

Although most users were pleased with the announcement, some expressed concern about what IBM did not say.

"Right now, the announcements are more for mainframe software — tying DB2 and any other platform," said Shaku Atre, president of Atre/Intec, Inc., a data base consultancy in Rye, N.Y. "In the future, I would like to see more connectivity for OS/2."

Data base access

Gideon said that the Information Warehouse will enable an OS/2 client to access data in any DRDA-compliant data base, but at this point, it does not provide access to OS/2 Extended Edition Database Manager from another system.

IBM plans to support both client and server OS/2 access in the future, he said.

Chip Steinmetz, vice-president of data processing at American Airlines Decision Technologies, Inc. in Fort Worth, Texas, cited another point.

"I would like to see IBM come out with remote procedure call functionality" to access the data bases instead of using LU 6.2, he said. "This would enable guaranteed message delivery without having to establish a conversation [as is required with LU 6.2] and suffer all the overhead of that."

On the whole, users were positive about the announcements.

"What's exciting about [IBM's] formal announcement is that it has been long desired by the industry and it's a formal step forward," Cooper said. "Warehousing is a concept that we like."

UI backs use of OSF technologies

continued from page 13

action processing components and other technologies.

Although the OSF will also publish APIs for DCE, DCE differs from UI Atlas in that it does not dictate use of specific components for distributed computing.

"DCE has one primary goal — to solve the problem of multivendor interoperability — and that's what it does," said Jonathan Gossels, the OSF's business area manager, in response to UI's claims of UI Atlas having a more global scope. "It makes it easy to use and maintain applications in distributed systems.

"We're glad UI is endorsing DCE as part of [UI] Atlas. They're coming into step with the rest of the industry," he added.

Compliant technologies

UI said it has recognized seven "reference" technologies as UI Atlas-compliant, including Unix System V Release 4.0 MP and 4.1 ES, which are used for multiprocessing and security features, respectively. Also included on that list are the Tuxedo System/T for distributed on-line transaction processing; a full, seven-layer Open Systems Interconnection protocol stack for networking; Sun Microsystems, Inc.'s Network File System for distributed file management; C++ object-oriented programming language; and the ability to integrate personal computers into Unix nets.

Future technologies deemed integral for UI Atlas' mission and evolution include OSI virtual terminal, X.400 messaging, X.500 directory services; a graphical user interface that supports OSF's Motif and AT&T's Open Look under a single API; an expanded version of Sun's ONC that operates over wide-area networks and supports high-performance, high-availability replication of files; a global naming support system; and management of object distribution across networks.

Clothier dresses up net with frame relay

continued from page 13

thousands of dozens of orders that we would not otherwise have had," he said. "That would be more than enough to pay for the service. This is one of those services that's not hard to cost-justify."

Byer California has been testing a 56K bit/sec link to its showroom in New York. It will soon install the service in Dallas and Atlanta, and also plans to use it in Charlotte, N.C., Chicago, Los Angeles and Seattle.

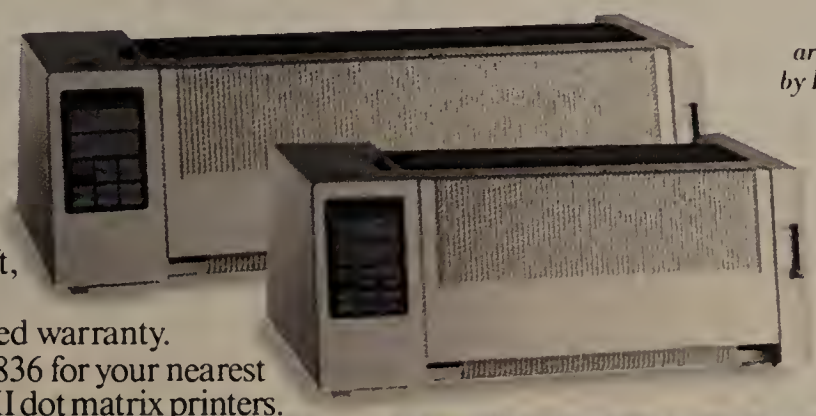
Another reason the company went with BT North America for frame relay is the carrier's service record with XLINK.

"We've seen proactive customer support," Higgins said. "They'll call and tell us a router isn't functioning properly [and diagnose the problem]."

That response is important for Byer California. "We have a small data processing organization," he said. "We run lean and mean. We like things that are simple and standard."

As with the XLINK service, BT North America provides all the necessary data communications equipment and monitors the service remotely. With frame relay, BT North America installs an Advanced Computer Corp. 4100 Series router at each customer site.

Introducing the straight, simple paper path of the new IBM PPS II printers.



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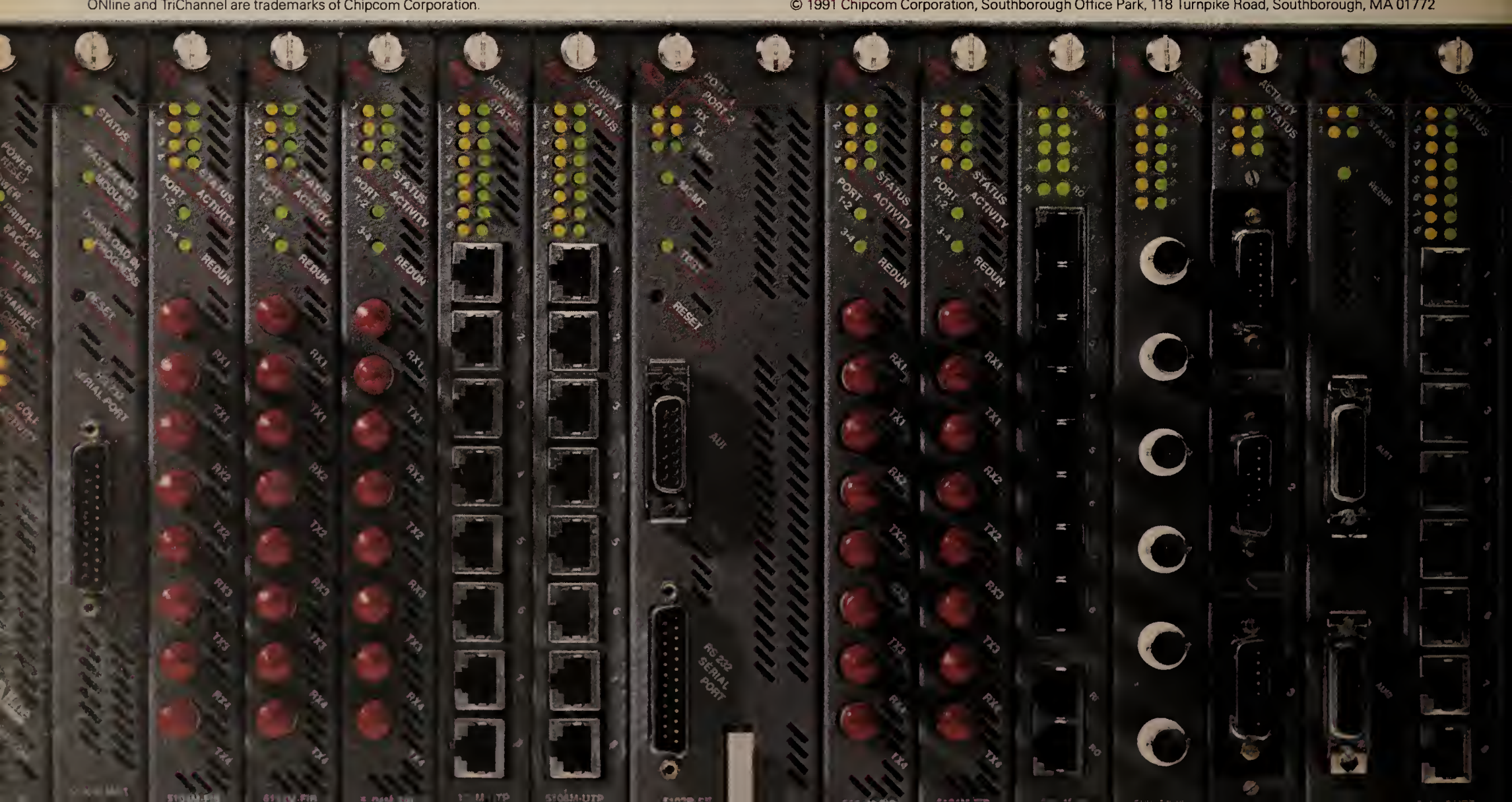

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Worth Noting

"EDI is here to stay. Today, the debate no longer revolves around whether EDI can fulfill its promise, but how quickly."

Marshall Spence
President
Electronic Data Interchange Council of Canada
Montreal

Association Watch

Microsoft Corp., in partnership with the **Technology Transfer Institute (TTI),** will offer its management education course to help corporate managers understand and implement emerging technologies.

"New Architectures for Enterprise Computing" will provide business and information systems managers with a comprehensive overview of client/server systems, graphical environments, personal computer-based networks and industry hardware and software standards.

The three-day course will be held in Boston, Chicago, Denver, Orlando, Fla., San Francisco and Toronto. It costs $1,195.

To register, call TTI at (213) 394-8305. For more information, contact Microsoft University at (206) 828-1507, ext. 1003.

Rochester Institute of Technology (RIT) in Rochester, N.Y., will begin offering bachelor's and master's degree programs in telecommunications via an electronic classroom format.

By combining audio and videoconferencing, electronic bulletin boards and on-line student services, RIT's Distance Learning Program allows students to learn when and where they want to learn while also providing classroom interaction.

For more information about the RIT degree program, call (800) 225-5748.

Hospitals see imaging as future cure for info flow

Pilot systems spur interest in enterprisewide use.

By Maureen Molloy
Staff Writer

CONCORD, Mass. — While there is significant interest among health care companies in using medical imaging systems, widespread deployment of imaging networks will not occur until the end of the decade, according to a recently published study.

The report, "Medical Image Management Systems, the Outlook: 1990-2000," examines the migration from traditional methods of maintaining filmed images, such as X-rays, with electronic radiology nets. Medical image management systems could essentially eliminate the need for film by enabling hospitals to store images on disk and allow workers to share them over a network.

The survey revealed that most users have a strong interest in image management systems but little knowledge of the current vendors and their products. It also found that many users were put off by the high cost of such systems and skeptical of inflated product claims made by vendors.

Currently, almost all medical images — including X-rays, computed tomography, nuclear medicine, ultrasound and magnetic resonance images (MRI) — are printed on film.

Full-scale medical image management systems, also referred to as picture archiving and communications systems (PACS), enable radiologists to digitize, store, print and send medical images over local and remote networks.

Electronic image advantages

Simultaneous access to medical images would benefit hospitals by making it easier for many end users, including doctors, nurses, insurers and quality assurance representatives, to quickly access and review a patient's medical record.

Another advantage of electronic images is the ability to modify the data in order to improve image quality. Using traditional methods, a poorly exposed X-ray, for example, cannot be altered or enhanced.

In addition, PACS makes archiving medical images easier and more efficient.

Despite these benefits, the study concluded that widespread implementation of completely filmless radiology networks probably won't occur until after

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EXECUTIVE BRIEFS

BY WAYNE ECKERSON

Financial EDI surges. Companies are increasingly using electronic data interchange to transmit payments to one another, according to the National Automated Clearing House Association (NACHA). NACHA, which tracks EDI payments made over the Automated Clearing House network, recently reported that for the first two quarters of 1991, the number of EDI payments over the net surged by 34%.

For that six-month period, NACHA recorded more than 3.6 million cash concentration and disbursement payments, nearly 178,000 corporate trade payment entries and over 95,000 corporate trade exchange payments.

Ethics on the rise? While individuals may be more conscious of the need to apply ethical behavior in the workplace, companies may be lagging behind in adopting and communicating ethical guidelines to employees.

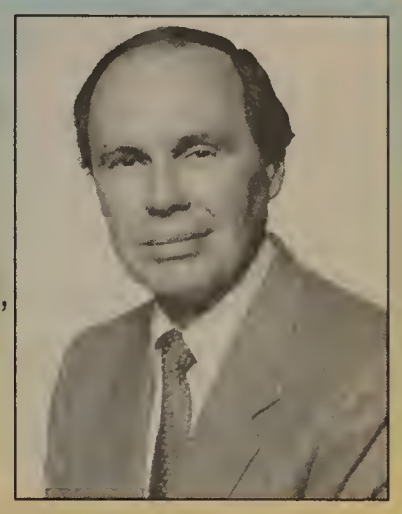
That's according to a survey of 200 business executives conducted by Accountemps, a Menlo Park, Calif., temporary personnel service for accounting, bookkeeping and information systems.

The survey found that 63% of the executives interviewed felt that ethical business behavior had increased during the past five years. Twenty-three percent said ethical behavior had decreased, while 12% said it had remained the same.

However, when asked to estimate the percentage of companies that have adopted a written code of ethics, the average answer of the respondents was only 44%.

"The go-go era following divestiture is over. That unique combination of events – revolutions in technology and business structure – created a demand for talent that is not likely to be repeated."

Frank Schoff
President,
Management Recruiters of Hendersonville, Inc.
Hendersonville, N.C.



Recruiter forecasts future of net careers

Talks of post-divestiture net job market, advises net managers how to adjust career strategies.

Q&A It's no secret that many network managers are concerned about their careers and future opportunities in the face of the present economic downturn and trends toward outsourcing, downsizing and corporate consolidations.

One man who closely monitors the pulse of the current network job market is Frank Schoff, a former net manager with more than 20 years of experience who is now an executive recruiter specializing in the placement of network professionals at user firms. Schoff is president of Management Recruiters of Hendersonville, Inc. in Hendersonville, N.C.

In a recent interview with *Network World* Senior Editor Wayne Eckerson, Schoff discussed the evolution of the post-divestiture network job market and advised net managers how to adjust their career strategies to match market realities.

Is the opportunity for advancement within the network field as great as it was right after divestiture?

The opportunities aren't as good as they were then, and I don't think they ever will be. Divestiture was a watershed event. There was a lot of chaos and unlimited opportunities for people to grow in the network profession. But compared to other technology fields, the opportunities in networking are still good. I wouldn't hesitate to advise my children to choose the network field as a career.

When did things begin to slow down?

Toward the end of 1987, AT&T and the telephone companies began to tighten their belts and let thousands of people go.

Then a whole series of things happened to tilt the balance the other way. Among them, the spate of mergers and acquisitions in the late 1980s eliminated entire network departments in ensuing consolidations, and the trend toward downsizing thinned out the ranks of middle management in which network managers reside. Also, advances in network technology and new automated network management tools have enabled the net department to increase productivity dramatically without having to add head count.

The availability of senior net management jobs is scarce compared to the number of highly qualified people who would like to fill those positions. There are simply more people in the market than it can satisfy. It will take a couple of years to shake out.

What impact is the current recession having on the network field?

The recession is taking its toll. Companies are cutting staff and have put a freeze on new hires. However, net professionals shouldn't expect that when the economy turns around, things will return to what they were.

The go-go era following divestiture is over. That unique combination of events — revolutions in technology and business structure — created a demand for talent that is not likely to be repeated. The network function is now staffed and managed with the same scrutiny as other information systems functions.

How can network professionals adapt to the current job market?

Network professionals need to reassess whether their allegiance

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Recruiter forecasts future of net careers

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is to the network profession or their employer. If it's their employer, net managers are going to have to learn about other parts of the business. I would encourage these people to attend seminars or conferences that focus on the core business they represent rather than attending network conferences every year.

People who want to remain technologists will have to change employers more often. They have to be aware of the point when their particular technological expertise is no longer cost-effective for their employer to retain. They will have to change jobs before this point, finding companies that need skilled professionals in their area of expertise.

What advice can you give net professionals who are unemployed or who want to change jobs?

The first step is to accept the market realities as they are today and will be in the future. Most net managers entering the job market today feel they should be able to land a new position as easily as they did the last time.

The next step is to be realistic concerning geography and compensation. Many people miss valuable opportunities early in their job search because they don't want to relocate, only to realize too late that they have to move if they want to land a good job. People also can't expect sizable salary jumps with every new job.

Another step is to identify the technologies that are likely to drive the market in the future and get training in them. People think that if they were skilled in voice communications technology in 1980, their market value should have increased. But the opposite has happened; voice skills have diminished in value relative to other technologies.

What areas in networking are in hot demand right now?

Most of the placements I have made have been for technical specialists rather than management positions. There are a good number of jobs out there in such areas as local-area networks, internetworking, wide-area network design and voice processing. I'm also seeing a big demand for individuals who have expertise in two or more technical areas.

Can net managers expect their companies to provide them with training in these new technologies?

The smart network professional will personally take charge of staying ahead of the training curve. Edgar Schein, career researcher at the Massachusetts Institute of Technology's Sloan School of Management, said recently that in a rapidly changing technology environment, it may be more costly to retain [technical specialists] than it is to bring in new talent.

Every net professional has to take it upon himself to stay ahead of this training curve, so when a company makes an assessment about whether it's cost-effective to retrain or replace an individual, the individual is ready to take on the next assignment.

Net professionals have to take more responsibility for personal skills development than in the past, either on their own time or through programs offered through the company. They need to reposition themselves so retraining is viewed neither as a costly process nor as a necessity.

How is the role of the network manager changing?

It's likely that by end of this decade, the job of the senior net manager will be performed by someone with multiple management assignments. This has happened in companies that have folded networking under an IS manager who has responsibility for computer operations, application development and end-user computing.

In fact, the network department may be evolving into the desktop technology department. Here net professionals will be responsible for everything that goes to the desktop, such as phones, computer terminal and voice and data wiring. This means that senior net managers will have to be proficient at managing nonnetwork functions and the remaining net professionals will be technical specialists.

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Imaging seen as cure for info flow

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the turn of the century, when the technology matures and costs decrease.

However, a substantial number of users were found to be developing mini-PACS — networks that serve specific applications, such as pediatrics or nuclear medicine, but which don't eliminate the use of X-ray film in more routine procedures.

About the survey . . .

The study was conducted by Concord Consulting Group, Inc. (CCG) in Concord, Mass., and was based on a survey of potential users and in-house analysis of the technology, clinical needs and economic forces.

The 250-page report also profiles 80 companies that offer products in this field. Included are the major imaging equipment companies as well as film companies, several regional Bell holding companies and others.

Additional information about the study can be obtained by contacting CCG's Philip Drew at (508) 369-8744.

World News

The **International Telecommunications Satellite Organization** recently established a timetable for selecting a new director general to replace Dean Burch, who passed away on Aug. 4.

Nominations for the position are due by Nov. 8. INTELSAT's board of governors expects to select a successor in March 1992.

In the interim, John Hampton will remain as acting director general.

In a separate action, INTELSAT recently approved a petition by Columbia Communications Corp. to provide satellite services between the U.S., U.K. and Hong Kong.

AT&T and **Telecom Canada** last week announced that customers can use 800 numbers in Canada to access Software-Defined Networks (SDN) in the U.S. for the first time. Previously, users in Canada could only access U.S.-based SDNs via private lines.

Separately, AT&T last week announced the availability of Switched Digital International service to Germany and Spain, bringing to 13 the number of countries to which AT&T offers the switched 56K and 64K bit/sec service.

AT&T also last week said it will use Brazilian network service provider Moddata, S.A. to market AT&T's electronic mail and private-line services in that country. AT&T offers analog private lines to that country as well as satellite-based, 64K bit/sec private lines under the Skynet International Service.

Net adds new dimension to animation production

Cartoon firm uses E-mail, fax to save time, money.

By Joanne Cummings
Staff Writer

BURBANK, Calif. — While DIC Enterprises, Inc. produces some of the most popular Saturday morning children's cartoons, its international networking efforts are anything but child's play.

The company, which produces such shows as "Hammerman," starring M.C. Hammer and "Pro Stars," featuring Wayne Gretsky, Bo Jackson and Michael Jordan, uses a combination of electronic mail and high-quality local-area network-based facsimile that saves time and money while providing an edge over competitors.

"It has increased our efficiency and productivity tremendously," said Seth Levenson, vice-president of MIS at DIC Enterprises. "We have actually gotten shows on the network because of our ability to communicate so quickly and efficiently internally. We've been able to jump on an opportunity where other people haven't been able to get their act together in time."

At the company's headquarters here, artists and writers work on 125 IBM-compatible personal computers equipped with video graphics adapter displays. These personal computers are attached to an Ethernet LAN supported by a NetFRAME Systems, Inc. NF-100 file server running Novell, Inc.'s NetWare 386 Version 3.11.

The net also supports about 15 remote nodes in Canada, Los Angeles and South Korea that are linked by dial-up lines.

The company uses Microsoft Corp.'s PC Mail E-mail software, enabling users to exchange all correspondence electronically with both local and remote nodes. The E-mail system is used in conjunction with Castelle Corp.'s FaxPress fax server product to send drawings over the net to the remote sites.

The E-mail system lets the company make the best use of its resources wherever they're located. For example, the company's voice talent is based mainly in Toronto and Vancouver, where most of the cartoons' voice recording is performed. Writers, which are based mainly in the Burbank office, put together a script for a show and then send it via E-mail to the offices in Canada, where it can be recorded.

Artists and writers in Burbank design the characters and develop the main scenes for a cartoon. Then they fax the drawings to animation studios in Seoul, South Korea, which produce all of the "in-between" frames, in effect, the rest of the show.

If the staffers in Burbank need to change the character information or a color, for example, that information is sent to the studios in Seoul via the network.

But the FaxPress product is "even better than E-mail," according to Levenson. It enables users to send high-quality documents, containing graphics and several fonts.

"And since everything in Hollywood is all show, the better you can make your stuff look, the better off you are," he said.

The FaxPress product is a network-attached device that performs the faxing to the remote site. Because the entire process is digitized, there is no loss in picture quality, except at the remote sites, which typically use a Group III fax machine. But Levenson said the quality is still far superior to using a hard-copy fax machine at both ends.

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The top 10 providers of international switched services

Carrier	Headquarters	Outbound switched traffic for 1990 (millions of minutes)
AT&T	U.S.	5,780
Deutsche Bundespost Telekom	Germany	3,146
British Telecommunications PLC	U.K.	2,170
France Telecom	France	1,921
Telecom Canada	Canada	1,420
Swiss PTT	Switzerland	1,356
Cable & Wireless PLC*	U.K.	1,291
MCI Communications Corp.	U.S.	1,132
Italcable, SpA and Azienda di State per i Servizi Telefonici	Italy	1,045
PTT Telecom Netherlands	Netherlands	905

US Sprint Communications Co. ranked 17th with 577 million minutes.

* Total represents 729 million minutes of traffic from Hong Kong Telecom International, Ltd., 362 million minutes from Mercury Communications, Ltd. and 200 million minutes from carriers that Cable & Wireless owns in the Caribbean.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTERNATIONAL INSTITUTE OF COMMUNICATIONS, LONDON

Study predicts fall in int'l switched prices

Increasing calling traffic not likely to offset growing glut in international fiber and satellite capacity.

By Barton Crockett
Senior Editor

LONDON — Users can expect significant reductions in international switched service prices over the next decade as carriers struggle to cope with a growing capacity glut.

While demand for international calling services will continue to increase worldwide, greater usage will not fill all the fiber-optic and satellite bandwidth expected to be installed over the next few years, according to the International Institute of Communications (IIC), a nonprofit research group based here. The group last week released "Global Telecommunications Traffic Report — 1991," a major study of global network traffic trends.

In addition to examining traffic trends worldwide, the study shows that users are benefiting from increased competition around the globe.

The IIC is funded by carriers and broadcasters from around the world, including such major U.S. carriers as AT&T and Bell Atlantic Corp. Its annual traffic report, first issued in 1989, is considered to be one of the most comprehensive sources of international calling volumes.

The report estimated last year's volume at about 30.5 billion minutes of international calls and noted that international calling volumes are doubling every three to five years.

For 1991, the IIC expects international calling volumes to rise between 17% and 20%, or somewhere between 35 billion and 36 billion minutes. By 1995, the IIC projects that those annual international call figures will

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Study predicts fall in int'l switched prices

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reach between 60 billion to 70 billion minutes.

Calling volumes are rising because of the globalization of the economy and falling prices for international switched services, according to the report, which predicts that prices on major routes will fall about 10% annually through 1995.

But international bandwidth is growing much faster than calling volumes. For example, the IIC estimates that the number of international voice-grade circuits across the Atlantic Ocean on cables — primarily fiber-optic cables — will increase approximately 350% to 809,000 by 1996.

Across the Pacific Ocean, the number of voice circuits on cables is expected to increase by 600% to 783,000 in the same period. Satellite capacity in both areas is expected to double by 1996 to a total of 927,000 voice channels.

"In this environment, further cuts in intercontinental call prices are inevitable," the IIC report stated. "The projected gap between supply and demand also suggests that carriers will soon begin to devote more attention to building a market for bandwidth-intensive services (e.g. dial-up video) to maximize their return on new cable and satellite investments."

This year's report also documents the increasing competitiveness of the international network arena. For example, MCI Communications Corp. experienced a 70% increase in international calling volumes in 1990, boosting its share of outbound international calls from the U.S. to 14.6%, compared to 10.2% in 1989.

MCI is now the seventh largest provider of international calling services in the world. US Sprint Communications Co., with slightly more than 6% of the U.S. market, this year entered the ranks of the 20 largest providers of international calling services (see graphic, page 21).

According to the IIC, US Sprint is the world's fastest growing provider of international calling services, with total outbound traffic increasing 686% since 1986. MCI is the world's second fastest growing provider of international switched services, with its total outbound minutes increasing 649% since 1986.

The IIC said these gains came almost entirely at AT&T's expense. In 1990, AT&T's share of international calls from the U.S. fell below 80% for the first time. AT&T now has about 65% of the domestic long-distance market.

Mercury Communications Ltd., British Telecommunications PLC's biggest competitor in the U.K., carries about 14% of all the outbound international calls from the U.K., compared to less than 1% in 1986.

Japan's Kokusai Denshin Denwa Company, Ltd. (KDD) has seen its share of outbound, international switched traffic drop from 93.3% in 1989 to 88% this year. New international carriers International Telecom Japan, Inc. and International Digital Communications, Inc. now have 6.5% and 5.5%, respectively, of that traffic.

Gregory Staple, editor of the IIC traffic report and an attorney specializing in international communications at Koteen & Naftalin in Washington, D.C., said competition from the two Japanese carriers has forced KDD to reduce international calling prices by about 40% since 1988.

Asia's strong growth

According to the report, international calling volumes are growing fastest in the Pacific Rim. For example, Japan's outbound international calling volume increased 23% last year, reaching 764 million minutes. Outbound international traffic from the U.S. increased 18% last year to 5.3 billion minutes, excluding 2.2 billion minutes of traffic to Canada and Mexico. Germany's outbound international traffic grew 14% last year, rising to 3.1 billion minutes.

The report said the three international routes with the highest calling volumes — each with more than one billion minutes of traffic last year — are between the U.S. and Canada, the U.S. and Mexico, and the U.S. and the U.K.

Net adds dimension to animation

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FaxPress enables the Burbank staff to schedule when they will send their fax documents. This is important because a storyboard, which contains sketches of all the main scenes and dialogue for an entire show, can total about 200 pages. Faxing such a document is a lengthy chore, but it can be scheduled to run on the FaxPress unit overnight, taking advantage of less expensive telephone charges and arriving at the studios in Seoul the next morning.

FaxPress also includes a feature that will kick off a message to pop up on the user's screen, notifying the user if the fax was sent without errors or if it has failed to send.

The E-mail/fax combination has resulted in tremendous productivity gains for the company. For example, when executives are traveling, they take along a laptop notebook computer, together with internal modems and an acoustic coupler, called a telecoupler, that enables them to hook up to any phone whether it be a car phone, a pay phone or a phone overseas. They can pick up their E-mail and respond to it, never losing contact with the home office.

"It's a tremendous advantage," Levenson said.

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PRODUCTS & SERVICES

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First Look

Equinox terminal server links to Unix, VAX hosts

Equinox Systems, Inc. recently unveiled a 48-port terminal server that provides access to Unix or Digital Equipment Corp. VAX hosts.

The **ELS-48 Ethernet Terminal Server** is available in 12-, 24-, 36- and 48-port configurations. Users expand the number of terminal ports by adding a new board to the chassis.

The device links end users to any Ethernet-attached Unix or VAX host running the Transmission Control Protocol/Internet Protocol or Local Area Transport (LAT). The firm's previous terminal servers supported only LAT.

Terminals may connect with the ELS-48 using Telnet, rlogin or LAT protocols.

The unit, which may be wall- or rack-mounted, is expected to be available next month. Pricing ranges from $2,500 for a 12-port model to $5,400 for a 48-port model.

Equinox Systems, Inc., 14260 S.W. 119th Ave., Miami, Fla. 33186; (800) 275-3500.

EXOS offers low-cost Ethernet concentrator

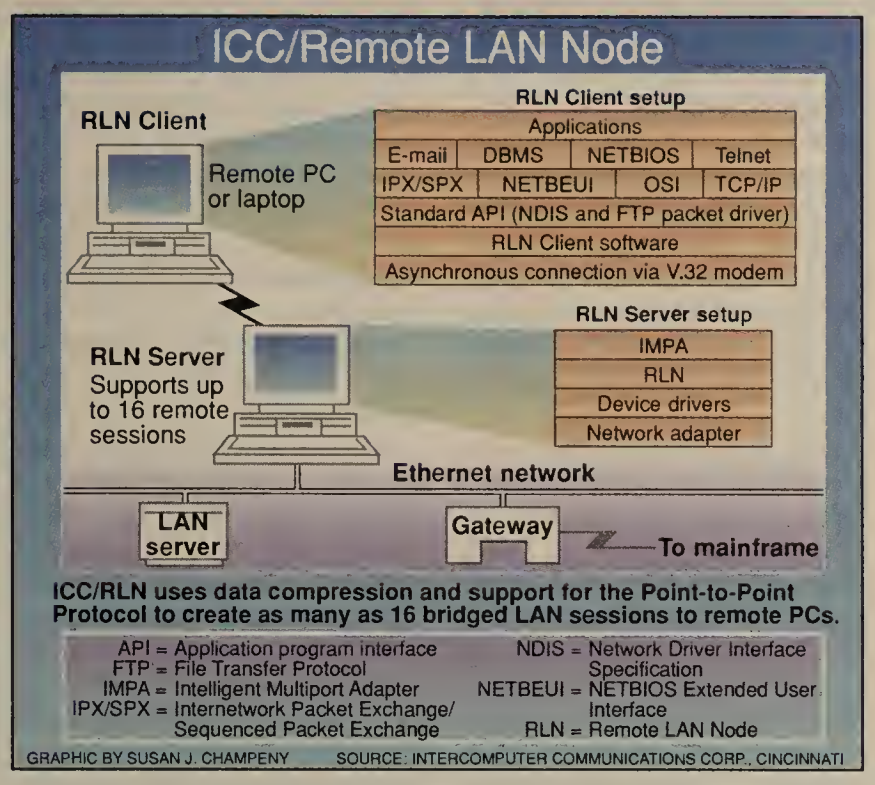
EXOS, a division of Microdyne Corp., recently unveiled a low-cost Ethernet concentrator.

The **EXOS 5318** is a standalone unit that can handle 18 10Base-T connections and is configured with 16 RJ-45 twisted-pair ports on its front panel. An attachment unit interface and BNC connector are located on the rear panel.

The concentrator can continuously monitor each of its ports to ensure optimal signal quality. If it detects line noise or excessive transmission collisions from an attached device, it can automatically disconnect that unit from the network. When the condition has been corrected, it automatically reconnects the device. The EXOS 5318 can also detect and correct incorrect polarity in incoming signals.

The product is available now and costs $895, or about $50 per port.

EXOS, 207 S. Peyton St., Alexandria, Va. 22314; (800) 255-3967.



Tool lets PCs act as local nodes on remote Ethernets

Can be used with mix of net operating systems.

CINCINNATI — Intercomputer Communications Corp. (ICC) recently unveiled ICC/Remote LAN Node (RLN), a product that enables a remote laptop or personal computer user to log on to an Ethernet LAN and access services as if the device were a local node.

ICC/RLN is different from remote shells or remote control software because it is not tied to a single operating system protocol and uses data compression to extend local-area network speeds to remote users, the vendor said.

This enables users to log on to any popular LAN operating system such as Banyan Systems, Inc.'s VINES, Microsoft Corp.'s OS/2 LAN Manager and Novell, Inc.'s NetWare. Remote users can also run Microsoft's Windows to maintain a consistent user interface with local users.

> The remote access gateway can support as many as 16 remote LAN sessions simultaneously.
>
> ▲▲▲

ICC/RLN will compete against established remote access products such as Microcom, Inc.'s Carbon Copy, Telebit Corp.'s NetBlazer, David Systems, Inc.'s WAN Server and Novell's Novell Access Server.

ICC/RLN is a hardware/software combination that resides in a LAN-attached microcomputer that is positioned as a remote access gateway. The remote access gateway can support as many as 16 remote LAN sessions simultaneously. A software shell also resides on remote personal computers.

The product can be used to access LAN file servers, transfer files via DOS copy commands, print files from a remote device to LAN-attached printers, run Network Basic I/O System applications remotely, access electronic mail or data bases, and establish host sessions via a LAN gateway.

> The software portion of ICC/RLN is architected to run in a client/server setup.
>
> ▲▲▲

ICC/RLN consists of software and a personal computer add-on card called an Intelligent Multiport Adapter (IMPA), which resides on the remote access gateway and supports between four and 16 communications ports to connect to V.42bis modems. To gain access to the LAN, users dial into the IMPA on the remote access gateway, which is linked to the Ethernet via an adapter.

The software portion of ICC/RLN is architected to run in a client/server setup, with a client shell residing on remote personal computers and the server portion

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Racal-Datacom rolls out new SNMP tools

Firm also unveils frame relay support for its T-1 muxes, enhancements to its intelligent wiring hub.

By Joanne Cummings
Staff Writer

SAN DIEGO — Racal-Datacom, Inc. unveiled a variety of products, including management software and frame relay support for its T-1 multiplexers, at the 1991 TCA Annual Conference here last week.

The company's product rollout also included E-1 support for its T-1 multiplexers, enhancements to its intelligent wiring hub and two new V.32 modems.

Racal-Datacom addressed integrated local- and wide-area network management with two new Simple Network Management Protocol (SNMP)-based software tools. The Communications Management Series (CMS) 400 LAN Manager module runs on an IBM Personal System/2, and the CMS 6000 LAN Manager module runs on a Sun Microsystems, Inc. SPARCstation.

Both modules provide WAN system administration, fault detection, configuration and other management capabilities for Racal-Datacom products — such as multiplexers, modems and data service units — as well as other vendors' SNMP-compliant products.

The CMS 400 LAN Manager software module costs $5,000, and the CMS 6000 LAN Manager module is priced at $6,495. Both are scheduled for availability in the first quarter of 1992.

In conjunction with the management products, Racal-Datacom also announced that its System Performance Analyzer (SPAN)/2 will now monitor 64K bit/sec circuits and X.25 traffic.

SPAN/2, a card and software package, runs in a personal computer. It monitors traffic flow, isolates response time problems and stores statistical data for identifying trends and network optimization.

Previously, SPAN/2 could monitor lines running up to 19.2K bit/sec. It could also monitor Systems Network Architecture/Synchronous Data Link Control networks, as well as Burroughs Corp., Binary Synchronous Communications and International Programmed Airline Reservation System traffic.

Pricing for SPAN/2 starts at $15,000 and varies according to configuration.

Frame relay support

Racal-Datacom also announced it has added frame relay support to its Omnimux T-1 multiplexers.

The Frame Relay Module (FRM) for the Omnimux multiplexers provides interconnectivity between LAN bridges, routers and other data devices, as well as encapsulation of synchronous

(continued on page 24)

PictureTel videoconference bridge links up to 16 sites

By Barton Crockett
Senior Editor

PEABODY, Mass. — PictureTel Corp. last week introduced a new multipoint videoconferencing bridge that enables as many as 16 sites to participate in a videoconference.

The M-8000 is designed to support videoconferences over switched or dedicated links at speeds between 112K and 384K bit/sec. It can handle twice as many sites as its predecessor, the M-7000. Without multipoint bridges, videoconferencing systems can only support one point-to-point videoconference.

The M-8000 uses switched digital links more efficiently than the M-7000. For example, the M-8000 is able to route both video and audio signals over two switched 56K bit/sec lines. The M-7000, by contrast, requires two switched 56K bit/sec lines to support a video signal and a third dial-up telephone link for voice communications.

The benefits of the M-8000 over the earlier product persuaded at least one user, Hoechst Celanese Corp. in Bridgewater, N.J., to wait for the new model.

Hoechst Celanese plans to install the M-8000 after the product begins shipping in the fourth quarter.

The M-8000 comes in two configurations. The Model D comes in a 17- by 18- by 23-in. cabinet.

(continued on page 24)

Bridge links up to 16 sites

continued from page 23

Customers must use a separate rack for attaching data service unit/channel service units (DSU/CSU) or terminal adapters to the bridge.

The larger Model S comes in a 72- by 22- by 26-in. cabinet. It includes extra slots that enable users to place DSU/CSUs directly into the cabinet.

A low-end configuration of both models, supporting only three remote sites and DSU/CSUs supplied by the user, costs about $75,000. A high-end configuration, which supports 16 remote sites and DSU/CSUs from PictureTel, costs about $200,000. Both models are able to handle as many as 16 switched or dedicated wide-area links at speeds up to 384K bit/sec.

In a standard configuration, customers will use two switched 56K bit/sec circuits to access the M-8000. Of the total 112K bit/sec bandwidth, 80K bit/sec will be devoted to video and the remaining 32K bit/sec will be used for audio.

By contrast, in a point-to-point application, PictureTel's System 4000 videoconferencing system only uses about 16K bit/sec of the 112K bit/sec bandwidth for voice. James Idelson, the firm's director of product marketing, said the M-8000 uses more audio bandwidth to better accommodate the added burden of supporting multiple sites.

But the reduction in video bandwidth makes the quality of video routed through an M-8000 bridge noticeably worse than the quality of video routed between PictureTel videoconferencing systems in a point-to-point application.

Robert Mitro, PictureTel's vice-president of sales and marketing, said the company plans to support the emerging CCITT standard for multipoint bridges on the M-8000. This standard is expected to be finalized in mid-1992.

Currently, the M-8000 only supports audio at 3.4 KHz. This toll-quality audio sounds flatter than the wideband 7-KHz audio that PictureTel now supports on point-to-point videoconferences. The company said it plans to support 7-KHz audio on the M-8000s in December.

For more information, contact PictureTel at 1 Corporation Way, Peabody, Mass. 01960, or call (508) 977-9500.

Tool lets PCs act as local nodes

continued from page 23

residing in the personal computer serving as a remote access gateway.

Both client and server software support the Point-to-Point Protocol, which enables remote devices to appear as bridged LAN nodes to LAN servers. Proprietary data compression algorithms also enable remote users to achieve response times comparable to those of locally attached users.

"We think that by giving users access to full LAN services and acceptable response times at a remote site, they'll feel confident enough to run client/server applications to their remote users," said Ian Pennell, an ICC division leader.

The RLN Server software, which runs in the remote access gateway, is responsible for systemwide configurations, multitiered security and implementation of various protocol and data compression techniques to improve throughput between the LAN and remote devices.

The RLN Client software on each remote personal computer provides support for the Network Device Interface Specification (NDIS) and the FTP/Clarkson Packet Interface Drivers to link to network operating systems and other protocols loaded on the remote device, such as the Transmission Control Protocol/Internet Protocol or Novell's Internetwork Packet Exchange (IPX).

LAN-based applications run on the microcomputer supporting the remote access gateway, which extends the session to a remote user.

One drawback of existing remote access products is that many have limited security features. ICC/RLN provides dialback security, Pennell said. Also, users can install an optional remote adapter that contains a unique network address identifier to gain access to network resources.

ICC/RLN runs on a remote computer supporting DOS 2.11 or higher; the server portion of the software must run on at least an Intel Corp. 80286-based microcomputer.

ICC/RLN pricing ranges from $380 for a two-user version to $7,010 for a 16-user version with full system security features.

For further information, contact ICC at 8230 Montgomery Road, Cincinnati, Ohio 45236, or call (513) 745-0500.

Firm rolls out new SNMP tools

continued from page 23

bit-oriented data and asynchronous data. Instead of dedicating separate T-1 channels to synchronous and asynchronous data, users can combine the two data types to minimize bandwidth requirements.

FRM is expected to be available by year end. A basic module, which includes three RS-422 ports, five RS-232 ports and one Ethernet port, is priced at $25,000.

New interface cards

Racal-Datacom announced it has added new trunk, voice and data interface cards for its Omnimux 9000 System T-1 multiplexer that support international network standards.

The Inter Nodal Link-2E trunk card provides support for E-1 facilities. The card, which is fully compliant with the Conference Europeenne des Postes et Telecommunications standard, allows access to the 2.048M bit/sec transport speeds of E-1. It also conforms to CCITT G.704, G.823 and G.732 standards.

The company's new Pulse Code Modulation (PCM)-30 voice

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card provides an E-1 connection from the Omnimux 9000 to devices such as private branch exchanges and channel banks, as well as the public network. It allows simultaneous voice and Nx64K bit/sec data connectivity, eliminating the need for separate voice and data links, the company said.

The PCM-30 conforms to CCITT G.703, G.704, G.732 and G.823 standards.

Racal-Datacom also unveiled its A-Law 4-Wire E&M port card for the Omnimux 9000. The new product provides analog PBX connectivity to an E-1 facility by converting voice signals from analog to digital.

In addition, the firm offered its A-Law Adaptive Differential Pulse Code Modulation card, which provides 2-to-1 voice compression on the Omnimux 9000. This reduces bandwidth requirements and the cost of international transmissions, according to the company.

Racal-Datacom also unveiled a two-port X.21 card that provides access to the Omnimux 9000 for devices with an X.21, RS-449 or V.36 interface. It supports data rates from 1,200 to 72K bit/sec.

In addition, the company offered a four-port V.24/RS-232 data card that supports synchronous and asynchronous data from 1,200 to 19.2K bit/sec, a two-port V.35 data card that supports synchronous V.35 data at rates of 1,200 to 56K bit/sec and a two-port V.35 High-Speed Data Card that supports synchronous V.35 data at rates of Nx56K or Nx64K bit/sec.

Terminal server software

Racal-Datacom introduced Version 2.0 software for the terminal server card of its INTERNExT (INX) 5000 intelligent wiring hub.

The INX network terminal software (NTS) card now offers expanded SNMP management, which includes more control over error rates and thresholds, eight-bit Telnet support and a macro-computer programming facility, which enables users to customize menus and invoke repetitive operations with a single command.

As with the previous version, the card provides simultaneous support for both Local Area Transport and the Transmission Control Protocol/Internet Protocol.

The card comes in two modules. The INX-NTS-TELCO, which provides 16 ports and two 50-pin telephone connectors, costs $2,995.

For the same price, the company offers the INX-NTS-RJ45, which has 16 RJ-45 connectors.

The new version is expected to be available on Oct. 1.

The company also announced a fiber-optic module for the INX system. The INX fiber-optic interrepeater link (INX-FOIRL) module provides for six fiber-optic links, either to other devices or to a backbone fiber net. The module supports Ethernet but is not compliant with the Fiber Distributed Data Interface.

INX-FOIRL is priced at $2,500 and is available now.

V.32 modems

Racal-Datacom rolled out two new V.32 modems.

The company unveiled the RMD 3232, a 12K bit/sec V.32 internal modem for use in IBM Personal Computers, XTs, ATs and compatibles.

The RMD 3232 provides error correction using CCITT V.42bis or Microcom, Inc.'s Microcom Network Protocol (MNP) Level 5. The product automatically negotiates the highest common level of error correction with the remote modem. Any frames received with errors automatically initiate a request for retransmission.

Racal-Datacom unveiled its A-Law 4-Wire E&M port card for the Omnimux 9000.

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The modem is Hayes Microcomputer Products, Inc. AT-compatible. It is available now at a cost of $795.

Racal-Datacom also introduced its RMD 3296, a standalone V.32 modem that operates over two- or four-wire leased or dial-up lines at speeds ranging from 300 to 9.6K bit/sec.

The RMD 3296 modem supports data terminal equipment speeds of 38.4K bit/sec and offers V.42bis or MNP Level 5 data compression.

It has a Hayes-compatible autodialer feature, which lets it emulate a Hayes modem for connections to computers running communications software based on the Hayes AT command set.

The RMD 3296 offers three modes of password security. Auxiliary Channel Security enables the modem to identify other RMD 3296 modems and deny access to users without the proper password.

The Passthrough Security and Callback Security modes are designed for the Hayes AT mode of operation and can operate with any modem.

Passthrough Security provides direct connection into the network from a remote location, such as a hotel room, just by using a password. It can be activated by punching a code into the front panel of the modem. Otherwise, the modem will use Callback Security, which calls the user back to verify the password.

The RMD 3296 is available now and costs $1,095.

For more information about the new offerings, contact Racal-Datacom at P.O. Box 407044, Fort Lauderdale, Fla. 33340, or call (305) 846-1601.

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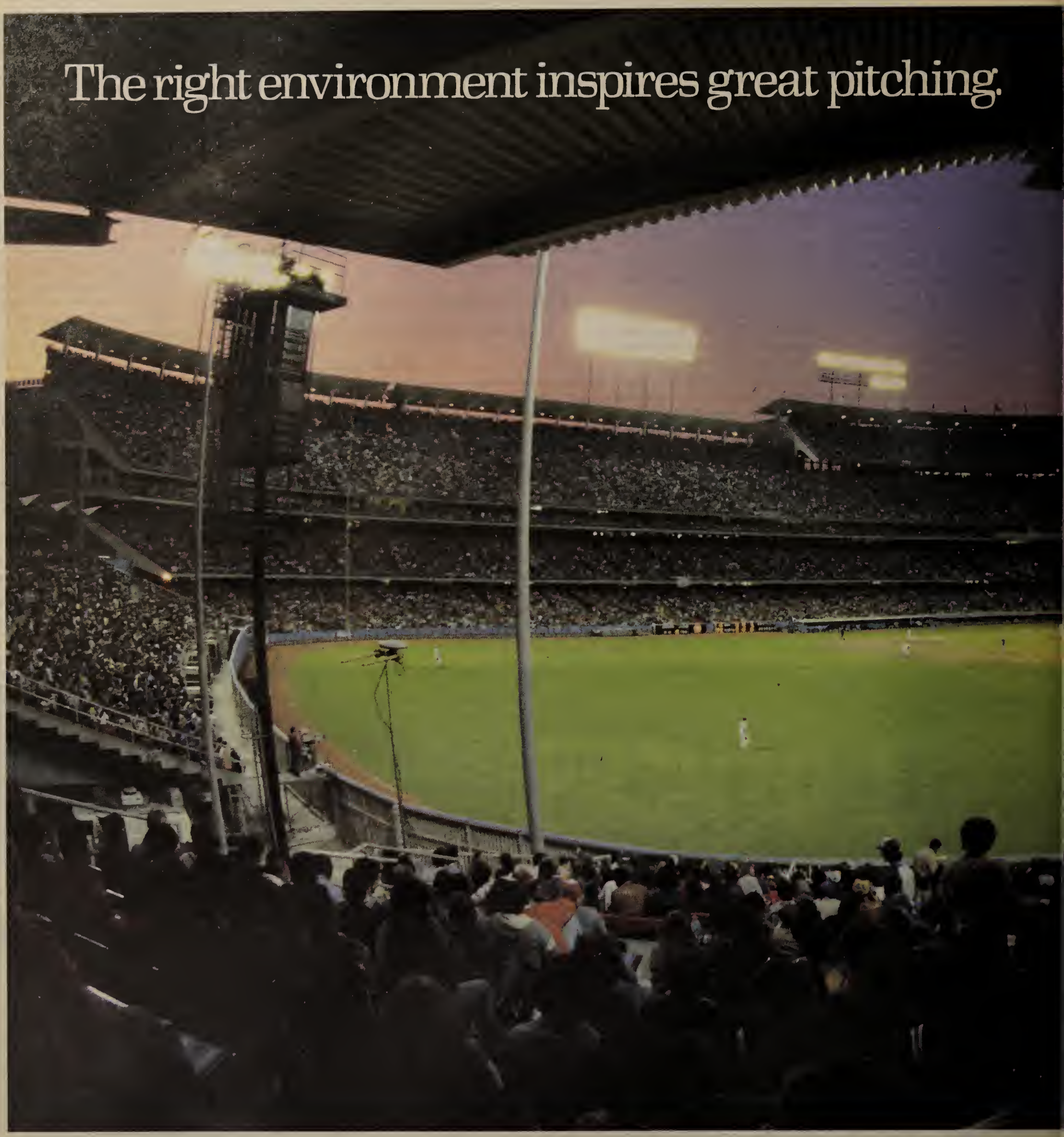

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OPINIONS

DOWNSIZING

BY MICHAEL ZURIK

A successful transition requires employee buy-in

A downsizing effort — moving from a mainframe or minicomputer environment to local- and wide-area networks — can be a daunting undertaking. A host of technical problems must be dealt with as programs and applications are transferred or completely rewritten for the new environment.

But the biggest challenge you face in a downsizing effort may come from your own employees. For many workers, especially those who have been working in one particular environment for many years, such a change in operations may feel like a jump into the unknown. What was understandable and almost cozy now seems foreign and uncomfortable.

If you're lucky, most of your employees will go into the transition with an open mind. Others, however, may take an adversarial stance in regard to the new technology and may attempt to block or impede its implementation for as long as possible. Still others may scoff at the new direction while looking for as many reasons as possible why it won't work. If such problems with employees arise and are not corrected, greater difficulties could result. A recalcitrant work force, or one that is split between two factions — one representing the old, another the new — is a recipe for disaster.

> A work force that is split between two factions is a recipe for disaster.
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There are ways to cope. To prevent schisms and reduce possible anxiety among your employees you should:

- **Listen to your people.** Take the pulse of your operation. Ask workers how they feel about what is happening. While some will be dazzled by the new equipment and excited about how the new configurations will perform, others may be reaching for their antacid pills. Understand that there will be a wide range of reactions. Be prepared to listen and address all the concerns of your employees.
- **Reassure your people that they are still valuable members of the team.** Let them know they are integral to the success of the enterprise. Remind them that while things may be unfamiliar and strange for a while, it won't last forever. Accentuate the fact that they will be learning new systems and broadening their experiences and knowledge bases.
- **Involve your people in the entire process, preferably from the beginning.** Tell your employees what is happening and why along every step of the way. Give them reasons for the decisions and don't try to evade or sugarcoat unpleasant facts. Also, give your workers information about exactly how they will fit into the new environment and what will be expected of them. Solicit and use their ideas and suggestions, even though real expertise and implementation may come from other sources. Your people can still provide insights into many areas, based on their backgrounds. They may generate ideas others have overlooked.
- **Educate your people in the new systems.** Give them and yourself all the training necessary to fully implement and utilize the new environment. The more they know, the better they'll be able to function. Continual, in-depth training will also tell your people that you're as committed to them as you are to the new technology. It also will keep your priorities straight.

Remember: People, not machines or programs, run the information business.

Zurik is an information system manager for the Eastern region of the Federal Aviation Administration, based in Jamaica, N.Y.

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EDITORIAL

AT&T outage shows public network vulnerability

AT&T's network outage two weeks ago raises questions that government officials, legislators and AT&T personnel will be examining in the weeks to come — not the least of which is why the nation's air traffic control system was so vulnerable to a communications disaster.

But one point this outage makes clear is the need for the federal government to step up efforts to guarantee the reliability of the public network.

The network is the lifeblood of the U.S. economic system. But despite ongoing pressure from major users, the Federal Communications Commission hasn't put into place the oversight mechanisms and policies necessary to adequately monitor service quality and minimize or prevent outages. For example, until this outage, the FCC didn't even have a formal policy requiring carriers to notify it of outages in a timely fashion.

In recent years, key members of Congress and the FCC have pushed deregulation of the communications industry, seeking to give AT&T and the regional Bell holding companies greater market freedom. And they've been successful in many respects.

But as the industry deregulates, the federal government must put more emphasis on ensuring that these carriers — indeed, all common carriers — live up to high standards for service quality and net reliability.

We believe it's the FCC's role to address this issue, provided the agency is empowered with the proper resources by Congress. The FCC should establish stringent service quality standards and make sure carriers adhere to them. It should also ensure that carriers implement rigorous backup plans and redundant routing capabilities.

Groups such as the Telecommunications Association, Inc. and the International Communications Association have been voicing concern about service quality and reliability for some time. But the FCC appears reluctant to take a leadership role.

Congress, whose members have begun to voice concern as well, should mandate some changes if the FCC is unwilling to tackle the issue on its own.

Rep. Robert Wise (D-W.Va.) was right when he said, "The nation must have some assurance that the FCC is providing the proper oversight to ensure that carriers fulfill their responsibilities to provide reliable service to the public." We also agree with AT&T Chairman Robert Allen, who said in a full-page advertisement last week, "Apologies are not enough."

The government needs to act now, before a network crisis cripples the U.S.

OPINIONS

DISTRIBUTED COMPUTING

BY JOHN RYMER

Users should prepare to shrug off UI Atlas

Unix International, Inc. (UI) is telling anyone who will listen that its UI Atlas is a better architecture for distributed computing than the Distributed Computing Environment (DCE) from the Open Software Foundation, Inc. (OSF).

Don't believe it.

If you planned to implement the OSF's DCE in your organization, go right ahead. UI Atlas isn't worth the wait.

As a concept, UI Atlas is enticing. It would give users a single set of application program interfaces (API) that spans a variety of underlying operating environments and communications technologies. Users could write to the UI Atlas APIs and deploy their applications on the OSF's DCE or Sun Microsystems, Inc.'s Open Network Computing (ONC).

In addition, UI plans to use APIs conforming to Open Systems Interconnection specifications for UI Atlas. Therefore, users won't have to worry about being locked into a set of APIs controlled by any one group.

On the other hand, the OSF's DCE locks users and implementing vendors into certain choices and requires them to use the OSF's APIs. But there's a good reason for this: The OSF chose specific technology — either currently available or in development — for remote procedure call, naming, directory, time, file, security and threads services because the OSF is in the business of shipping real products, not paper APIs.

Judging by the above points, anyone would think UI Atlas is almost too good to be true. But when you take a closer look at it, UI Atlas fails on three points. First, UI has sketched out only a rough framework for UI Atlas, not a detailed architecture. Although fleshed out this month, UI Atlas still isn't complete. Second, the OSI interfaces that UI plans to use in UI Atlas won't be complete for years. UI has branded the OSF as proprietary because its DCE supports selected OSI standards. This claim is misleading, however.

The OSF has embraced the few OSI standards available to meet its implementation goals. In addition, the OSF is committed to evolving to other OSI interfaces as soon as they become available.

Third, UI Atlas will apparently be implemented by AT&T's Unix Systems Laboratories — a massive effort that will probably require at least a year, if not two years, to complete. Meanwhile, DCE implementations will be available from several vendors this fall.

> The OSI interfaces that UI plans to use in UI Atlas won't be complete for years.
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When you separate the rhetoric from the reality, two facts distinguish the OSF's DCE from UI Atlas:

- There are only three differences between DCE and UI Atlas.

First, UI Atlas must retrofit a mature product — Unix Systems Labs' Tuxedo — to provide transaction management services in a distributed environment, while OSF will use Transarc Corp.'s DCE-based Encina Toolkit, for which retrofitting is unnecessary.

Second, UI Atlas promises direct support of the OSI networking standard, while the OSF promises a migration to it.

And finally, the OSF's distribution strategy favors implementors that plan to ship large numbers of systems. By contrast, UI appears more sensitive to the needs of low-volume distributors.

- The OSF's DCE is software; UI Atlas is "specware." In other words, it's not a product, but just a set of specifications. This month, the OSF began shipping code, which will be available from at least a handful of the hundreds of vendors that plan to implement it. But UI Atlas remains just a fleshed-out framework including technology choices for some distributed services.

In this last regard, the OSF has a huge advantage over UI. Not only will the OSF's DCE be available to users well before UI Atlas implementations are, but the OSF has a leg up in making its software a mature, stable environment.

Distributed computing environments are operating system software, which is difficult to get right. By the time UI Atlas ships anything real, the DCE will have been through at least one round of bug fixing and fine-tuning in response to user experiences.

DCE is clearly best suited for supporting enterprise-scale applications for four reasons.

First, the DCE is a rich architecture designed to support enterprise-scale applications, and it can be extended to new functionality in the future. Second, DCE is independent of any operating system. Third, DCE is built from existing technologies and will soon be generally available. Fourth, DCE accommodates some OSI standards today and will evolve toward greater OSI compliance in future releases.

UI Atlas may someday be real. But today, it is a creature of UI's losing political battle with the OSF. In creating its DCE, the OSF decided to support, but not adopt, ONC. Unix System V partisans can't accept their loss in the DCE fight, and they're trying a new tactic with UI Atlas. My advice to users: Skip this political tempest and get on with your plans to implement distributed computing with DCE or ONC.

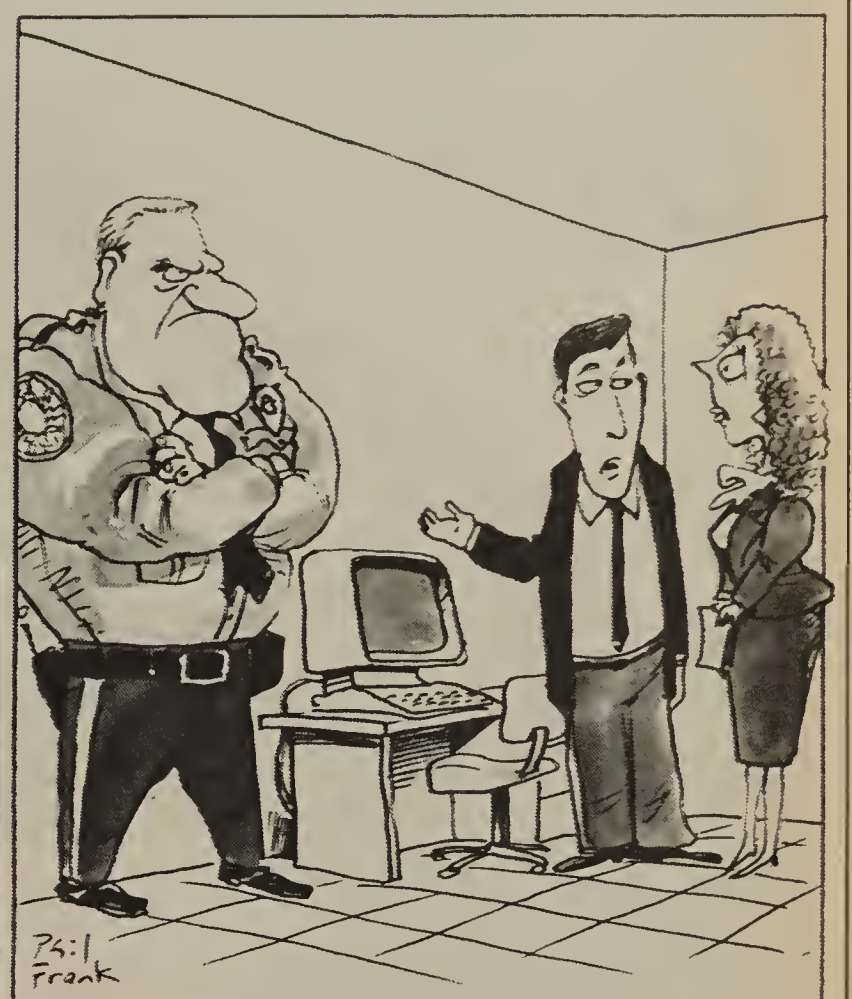
Rymer is editor in chief of Patricia Seybold's Network Monitor *and vice-president of Patricia Seybold Office Computing Group in Boston.*

LIKE ALLIGATORS IN A SWAMP, unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, associate features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

TELETOONS

BY FRANK AND TROISE



LETTERS

In favor of fax

In his recent column ("Does facsimile technology have a future?" *NW,* Sept. 2), William Robinson of the University of Nevada at Las Vegas argues that networked microcomputers are superior to facsimile technology.

However, Robinson's column overlooks three important points:

- Every modern Group III fax can automatically communicate with every other. Can the same be said for computers? Will the same ever be said of them?
- Even though the computer application that produced the paper cannot communicate directly with the application that needs its contents, fax effects a speedy and universal medium.
- What if the paper didn't come out of a computer? How about maps, drawings and photos? How about Chinese ideographs?

Philip Freedenburg
Executive vice-president
Federal Engineering, Inc.
Fairfax, Va.

Does facsimile have a future? The answer to this question is a definite yes. In his recent column, William Robinson has overlooked one major flaw in his plan of complete and total computer integration: paper. Once a document has been printed, there are only a few ways of delivering that paper to another user. Either the U.S. mail, private courier, facsimile or some type of image scanning capability on a computer with remote printing is needed.

The quality of fax has improved over the past several years. Group IV fax machines can print on cut-sheet plain paper, with resolutions of 400-by-400 dots per inch (almost twice that of standard

(continued on page 46)

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

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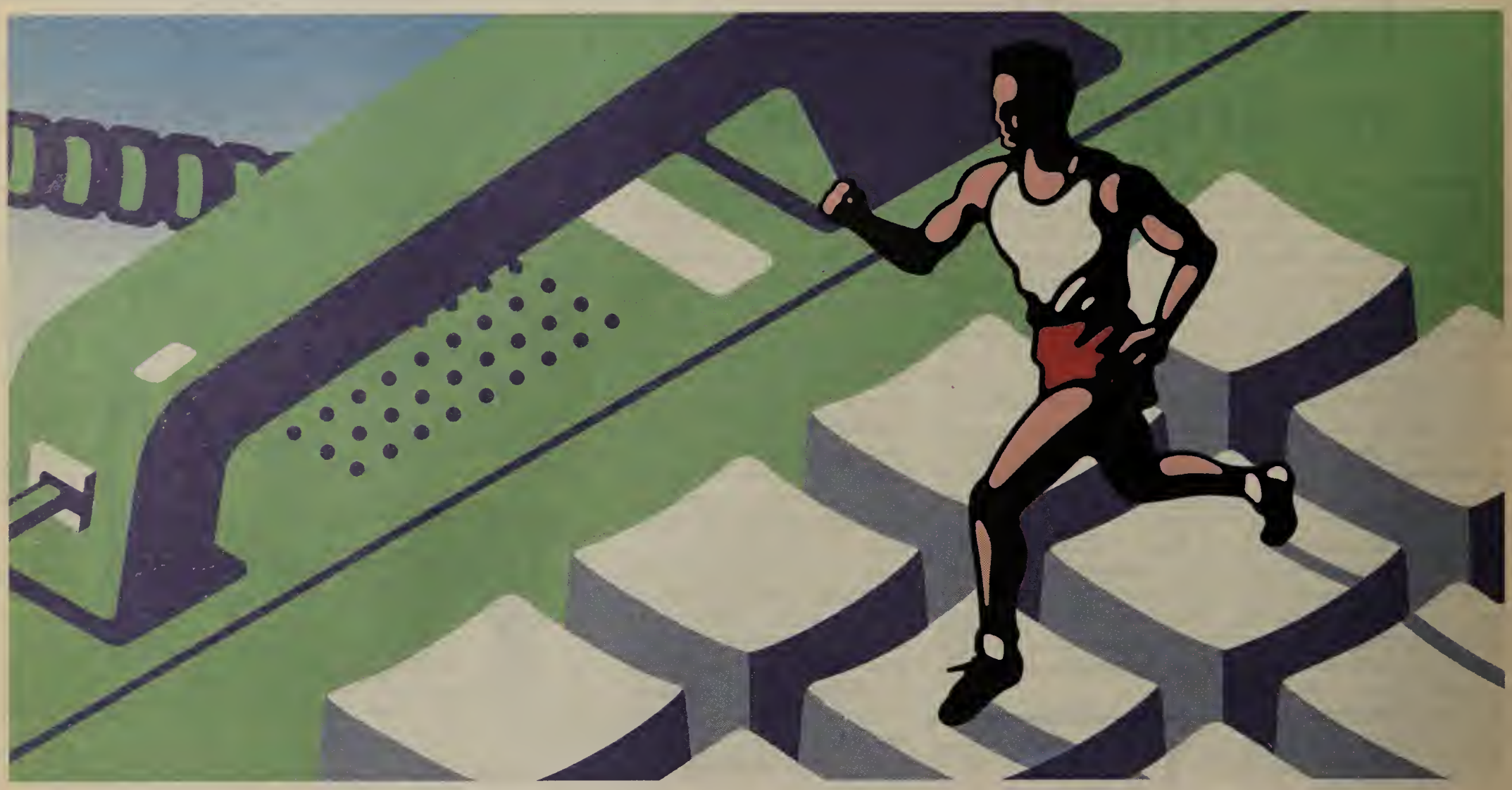

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X.500 shows users the way to the future

CONTINUED FROM PAGE 1

but in the long run, it will be essential.

"If a user has an adequate internal name directory, there is no reason to rush to X.500," says Ted Myer, a principal at Rapport Communications, Inc., a Palo Alto, Calif.-based consulting firm. "But if you plan to replace your directory service, you would have to be strongly persuaded not to get X.500 and should insist on X.500-compliant products."

Other observers, such as Marshall Rose, a principal at Dover Beach Consulting, Inc. in Mountain View, Calif., and vendors, including Digital Equipment Corp. and Hewlett-Packard Co., say that if a company plans on external electronic messaging or developing object-oriented applications in which network elements are defined and managed as separate objects, then the X.500 Recommendation from the Consultative Committee on International Telephony and Telegraphy is critical.

Why is X.500 so important? It is the directory service standard for Open Systems Interconnection networks and the key to success for other recommendations

(continued on page 32)

Cope is president of M/R Consulting Company, Inc., a Seattle-based marketing research and consulting firm specializing in data communications. She also directs research projects for industry analyst Frost & Sullivan, Inc. in New York.

Users are experimenting with the X.500 Recommendation, but few have plans to implement it immediately.

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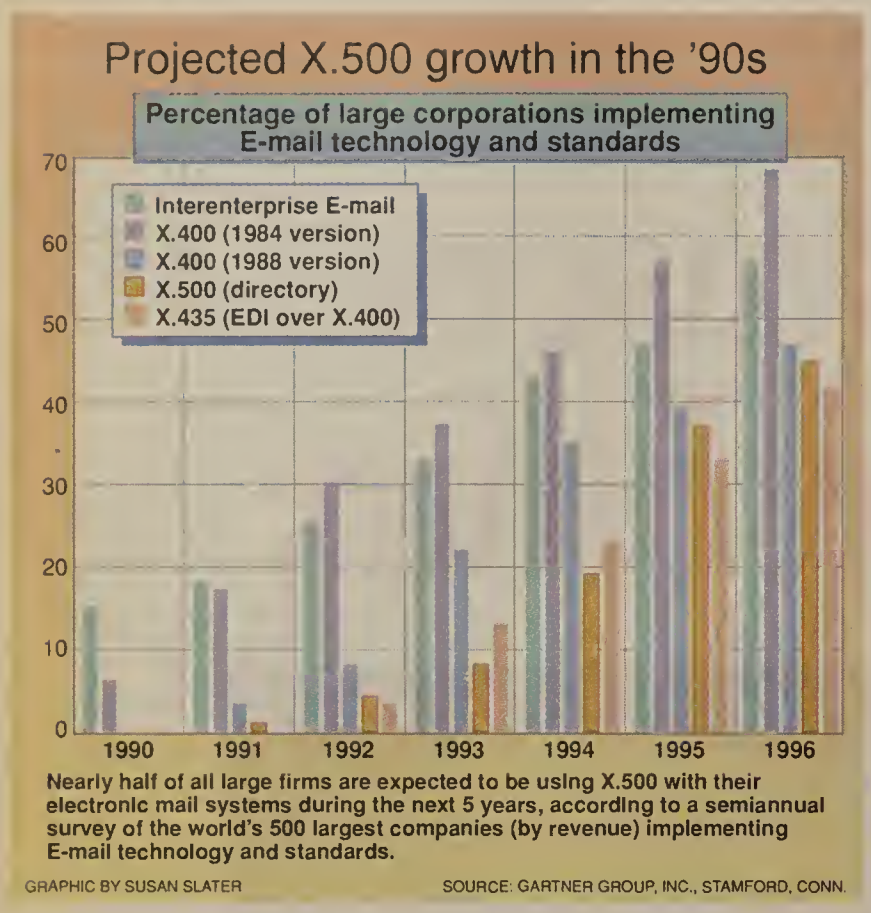
and standards. These include the CCITT's X.400 Message Handling System and OSI's File Transfer, Access and Management (FTAM).



Nearly half of all large firms are expected to be using X.500 with their electronic mail systems during the next 5 years, according to a semiannual survey of the world's 500 largest companies (by revenue) implementing E-mail technology and standards.

GRAPHIC BY SUSAN SLATER SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.

Both define commonly used modules to support communications between user applications.

More importantly, X.500 is the only worldwide standard for an E-mail directory. In other words, even non-OSI nets can use an X.500 directory, depending upon the vendor's implementation of the underlying network.

Conceptually, the grand scheme of X.500 calls for a single, global telecommunications directory distributed across many nets but accessible by all. No matter where a user is located, the information received about other users will be the same, subject to access privileges.

> "Each added E-mail system boosts the bar you have to get over."
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The X.500 Recommendation considers users as objects on the network, and, in fact, these objects can be people, computer processes or anything else an organization wants to define as such; arbitrary names can be given to arbitrary objects. The practical outcome of X.500 will be interconnections between directories maintained by user organizations, public carriers and information service providers.

A few users have definite long-term plans for X.500, and more are looking into it. But for most, the short-term concern is to interconnect their current systems, consolidate multivendor E-mail directories and perhaps limit the number of E-mail platforms. The issue is interconnections, whether aided by X.500 or not.

"Large companies have always had directory issues," says Walter Ulrich, a San Francisco-based consultant with Arthur D. Little, Inc., which is headquartered in Cambridge, Mass. "[The issues] are now more encompassing because of X.500. People are waiting [for products] and making do."

Ability to expand

According to Chris Stormont, director of network application services for Bank of Boston Corp., "E-mail is the first application to push you up against scalability," referring to the ability of an internetworked system to expand.

Scalability is essential, but the more systems you interconnect, the more difficult it becomes. "Each additional E-mail system boosts the bar you have to get over," says Peter Donaghy, laboratory manager of customer services and support at Hughes. The company operates nine E-mail platforms for its 22,000 users and performs 65,000 object translations between those systems each month, a figure that is growing.

In the next 18 to 36 months, Hughes will migrate to an X.400 backbone and implement an X.500 pilot program, Donaghy says. In the process, he will cut to two local-area network E-mail vendors to support the combined 100,000 users of Hughes and its parent company, General Motors Corp. The directory will increase from 110,000 items to 150,000 items in the short term and soon scale to 250,000 items.

Donaghy predicts that some of the X.500 products shipped next year won't be true X.500 products but "X.500-like," lacking features such as those required for external messaging. Meanwhile, Hughes "is doing a lot of planning, architecting and piloting," for an X.500 program that will take years to fully implement, he says.

X.500 or proprietary?

Some users, such as Bank of Boston, BASF Corp. and The Boeing Co., are considering an internally developed data base as an alternative to X.500 or to support migration to X.500. For example, Bank of Boston's Stormont may build an external directory in Oracle Corp.'s Oracle or another data base and feed it into the E-mail directories to track nearly 20,000 users worldwide while waiting for mature X.500 products.

BASF, the Parsippany, N.J.-based U.S. subsidiary of Germany's BASF AG, is migrating to X.500 in phases with an interim Oracle data base. The company first connected its 8,000 worldwide E-mail users through an X.400 backbone, a phase completed last January.

Currently, the company's 3,300 U.S. users are served by four E-mail systems: DEC's VMS Mail, Lotus Development Corp.'s cc:Mail, Microsoft Corp.'s MS Mail for PC Networks, and US Sprint Communications Co.'s dial-in SprintMail. All these users can exchange mail with each other via an X.400 facsimile gateway as well as with another 5,000 users in Germany with accounts on IBM's DISOSS, Data General Corp.'s CEO and other E-mail packages.

> Hughes will migrate to an X.400 backbone and implement an X.500 pilot program.
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But having E-mail connectivity is quite different from having E-mail directories that use the same name and address information (much less having them all updated automatically, which is what X.500 promises).

In July, BASF began the first phase of its BASF Master Directory Project to define a common user interface. This eight-week phase manually synchronized the various E-mail directories, updating information from each directory to all other directories.

Programs and batch files were written on a DOS-based personal computer to collect all the E-mail directory files, validate their data, merge the directories and send the merged version back to the local servers. Further updates will take place monthly.

In the current second phase that is expected to end in December, BASF is cutting to MS Mail as the primary platform and building a corporatewide master directory. The interface has been developed, and users can now query and modify telephone and E-mail data from MS-DOS and Microsoft Windows operating environments. The next step will be to connect the common user interface to the master directory.

The big question at BASF has been whether to use X.500 or a proprietary data base. Testing

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Start small, think big

Bewildered about how to begin implementing X.500? "Start small, but think big," counsels Hewlett-Packard Co.'s Adrian Carol Albin, X.500 product manager. She offers the following checklist, gleaned from experience with HP's X.500 Pilot Program users, to guide you from X.500 evaluation to rollout:

- **Look at your own messaging environment.** Inventory your needs; ask questions about what is and what could be. Consultants and vendors can help you with this task.

Do you have multivendor electronic mail systems? A single-vendor E-mail platform has its own update mechanisms. But if you have multiple E-mail systems, you must get the directories to work together.

Are you satisfied with your existing synchronization mechanism? If so, consider X.500 for object management applications such as printer, data and node locations.

Is the organization large or geographically dispersed? If so, updates will be a key concern.

How much external communication do you anticipate? If you communicate a lot with customers and suppliers, standards will be important.

How will you use E-mail in the future? Will you have multimedia documents? More external partners requiring access? Geographically dispersed groups of people who need to work together?

Assess where you are in terms of corporatewide directory structures. Decide how many there will be, who will administer them and whether your directory will contain non-E-mail information, such as telephone numbers.

Set up a study or advisory group. Identify how and how often to update the directory. The big problem with a centralized directory in a large or geographically dispersed organization is that updates are not done locally by the people who know their own groups best.

- **Have an object location vision.** Think about the role of enterprisewide resource location and how object name and location information can help your firm be more competitive.
- **Learn about X.500.** This must be in light of your own environment; you can't look at technology for technology's sake.

Take a class. Ask questions in the context of your own processing environment.

Study the standard. What is mandatory in the standard, and which options are must-haves for you?

- **Talk to vendors.** Get their perspectives on how the technology works.
- **Plan a pilot program.** Obtain the software and allocate the appropriate resources.

How will you eventually roll out the program? The pilot may be small, but think long term. Visualize the number of servers you will have, their physical locations and who will administer them.

What level of performance is required? Work with vendors to be sure your requirements will be met.

How do you want your information structure to look? Start building Directory Information Structures, or schemas, to structure your data.

Most pilot users are making changes to X.500, such as adding accounting codes, cubicle locations or organization committees.

- **Initiate a small-scale business trial.** Roll out first in a small, containable unit: a local-area network, a division, an E-mail system. Try linking all of one division's personal computer LAN E-mail systems to a server, or linking a minicomputer- or mainframe-based system across divisions.

How do you measure success? By user satisfaction with the update frequency and with the ease and speed of name access.

- **Roll out.** Pick another unit and deploy. Monitor your success across this and previous units. Make improvements where necessary.

— Patricia Cope

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(continued from page 32)
has just ended with a preproduction X.500 server from HP and an Oracle data base that runs on both a Novell, Inc. file server and on a personal computer with The Santa Cruz Operation, Inc.'s Unix installed.

All this testing doesn't sit well with Paul Freising, emerging technology analyst at BASF, who would prefer a plug-in product. "We're a chemical company," he says. BASF has decided to go with the Oracle approach, establishing

an X.500-like keying structure, or naming hierarchy, to ease a later migration to X.500. "We see no benefit [in all vendors' X.500 products] to date," Freising says, citing the need for more utilities and tools within the products and the lack of adequate access controls, such as measures to prevent BASF's telephone and E-mail administrators from modifying each others' directories.

There are also companies that are eager to launch standards-based projects when products come along. For example, Boeing is interested in X.500 but is currently consolidating its six directories into an Oracle data base for the short term.

While waiting for X.500-based vendor products, some users are still unsure of what approach they will take. "A question we're asking is, can we jump start this?" says Laurie Bride, manager of communications technology at Boeing Computer Services Co. in Seattle. "Our TCP/IP world has grown dramatically, and it gets more expensive to migrate as it grows larger. We prefer to buy off-the-shelf products but may have to do some special development." In addition, she observes that most "vendors' concept of 'large' isn't large enough for users like us."

Boeing's X.400 network has 20,000 nodes and will grow to 100,000 by the mid-1990s, running IBM's Systems Network Architecture, DEC's DECnet and other proprietary systems. "Vendors don't look at the heterogeneous processing environment of Boeing and its need to communicate with other firms," Bride says, noting vendors view it from their own perspective of personal computer, engineering workstation or mainframe.

She maintains that the products are developed for homogeneous work environments and do not interoperate well with other systems. "For large users, the person's workstation is a window onto the world, with significantly more value when it interconnects to the larger world," Bride says.

Another potential X.500 user is the Internal Revenue Service, which is taking a different tack. Its long-term plan is to use X.500's data base capabilities for names and addresses as well as FTAM to track the agency's 65,000 pieces of networked equipment, according to Nathan Sternburg, E-mail team leader for the Washington, D.C.-based group developing systems for IRS field offices.

Until then, however, the IRS is giving seven regional offices responsibility for their own E-mail as long as each system interconnects to the X.400 backbone being implemented at the national office in Washington, D.C. The IRS X.500 directory may eventually be organized around the national and regional offices as separate management domains rather than as a single, central directory, Sternburg says.

Not a trivial matter

Few users have more than a small X.500 pilot under way, and those who do complain of X.500's complexity and lack of an easy user interface. For example,

> "We see no benefit [in all vendors' X.500 products] to date."
>
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the Interdepartmental Research Center (IRC) of the Technical University of Berlin, has a 2,000-book technical library and personal data and addresses for 200 people on its two HP X.500 servers connected by an Ethernet.

The pilot test shows that implementing X.500 is not a trivial undertaking. According to Frank Ruge, who heads the technical implementation of the pilot test, modifying X.500's schema (a hierarchical information structure that defines a set of object classes and attributes in addition to relationships between classes) to suit your organization's data structure requires a deep understanding of the standard and how it defines and creates dependencies between attribute types, access rights, classes and subclasses. In addition, the user interface is "too technical and not ready for the secretary," Ruge says..

Next year, the university will begin an X.500 object management project to store and exchange network configuration data for two public telecommunications carriers' administrative management domains, checking to see if the networks can provide the bandwidth needed for a requested connection. Other X.500 projects depend on funding, but "The [X.500] people and software are now in place," says Klaus Rebensburg, doctor of engineering and director of the IRC.

Proposed X.500 projects include one to incorporate the university's library directory as one of many such directories in a trans-European distributed software library of education components, and another to develop X.500 directories for a multimedia document data base, document retrieval and FTAM.

An X.500 directory is in beta test at the University of British Columbia in Vancouver. The university codeveloped its Unix-based software with commercial vendor OSIware, Inc. of Burnaby, British Columbia, says John Demco, facilities manager in the university's computer sciences department and formerly manager of CDNnet, which ties together about 35 research, educational and industrial organizations in Canada. The directory is a full implementation of the 1988 X.500 standard, with extensions for the access control and replication features missing in the 1988 standard.

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The elements of X.500

X.500 governs the external behavior of directory software. The internal behavior, however, may vary among implementations. This glossary of X.500 terms may be helpful.

■ **Directory User Agent (DUA).** This is the interface between the user and the directory, letting users and applications access the directory.

A user can be a person, requiring a simple, user-friendly address such as a name, or it can be a computer process, such as finding a file and activating a request to transfer it, which requires more precise search criteria.

Different DUA implementations have different interfaces, but all use the same protocol to forward requests to the directory.

■ **Directory System Agent (DSA).** This is the access point for the DUA into the directory. It owns the directory data, maintaining the data base of entries. The directory is a collection of DSAs.

Because each DSA manages a directory portion (directory information base) on a given computer, you can implement a single DSA, to keep all information centrally or implement multiple distributed DSAs that can access a single DSA.

The functions of the DUA and DSA are similar, and security is implemented through both. For example, a security system may restrict access through the DUA, or deny the existence of objects or attributes to either end users or DSAs.

A name and password in the DUA allows directory access to its associated DSA, while DSAs must identify themselves to each other before exchanging information between servers.

The DSA guarding a particular directory information base grants access by DUAs or other DSAs, and may provide authentication (in the form of digital signatures) through the use of public and private keys that lock and unlock encrypted data.

■ **Directory Access Protocol (DAP).** This allows the DUA to communicate with the DSA, and allows the DUA and DSA to be on the same or different systems.

■ **Directory System Protocol (DSP).** A server must support DSP in order to forward requests over an Open Systems Interconnection network to other servers.

The DSP allows the directory to be virtually unlimited in size. Each enterprise can build and maintain one centralized or multiple distributed DSAs. They can exchange information with other DSAs, yet appear to the end user as a single directory. Whether centralized or distributed, the DUA may be located on the same system as the DSA or on a remote system.

The DAP and DSP are similar, and handle many of the same requests. But a true X.500 product is distinguished by having the DSP on the server; some products support only the DAP that is used to get to the server.

■ **Directory Information Tree (DIT).** This is a hierarchical, logical structure for maintaining and locating directory information. It gives each DSA a unique, unambiguous position in the structure and organizes collections of DSAs into Directory Management Domains. The overall DIT structure is hierarchical, but each DSA may store its directory entries in any type of data base, provided the user is presented with a hierarchical view of the data.

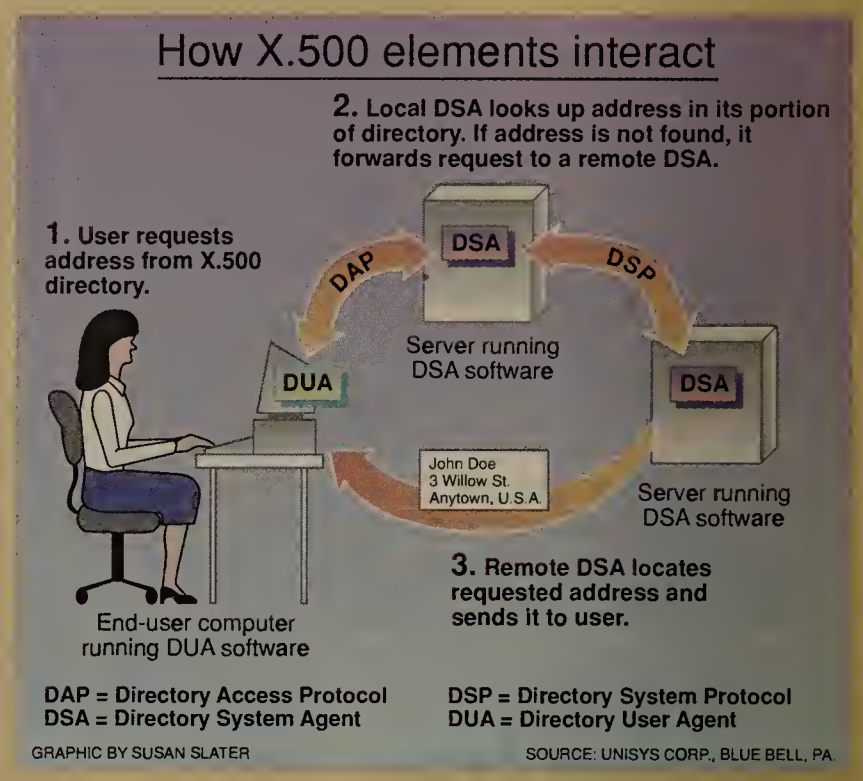
■ **Distinguished Name.** This is the unique name by which each object entry in a Directory Management Domain is known. To prevent duplications, unique country and organization names must be allocated by some central authority.

The distinguished name allows a path through the DIT hierarchy to an object entry. For example, a hierachical name path can go from country to organization to department to personal name.

■ **Directory Schema.** This contains rules that specify the categories of information stored in the directory, so DUAs can talk to each other. Categories are called object classes, such as "Organization" or "Person," and each object class has a defined set of attributes. Besides those object classes and attributes defined in the standard, a user may define objects to meet its internal application requirements.

■ **X-Open Development System.** This is a collection of application program interfaces for DUA services. The system allows applications that use or can access X.500 on one vendor's computer to be used on another vendor's computer.

— Patricia Cope



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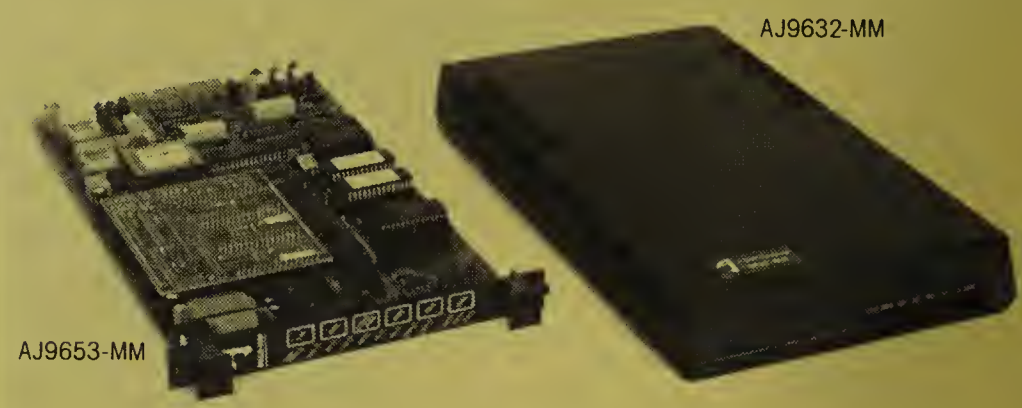

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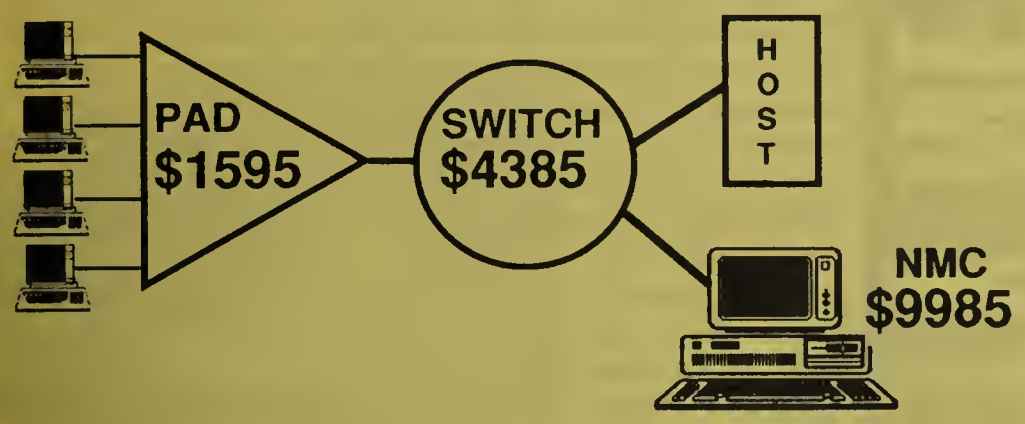

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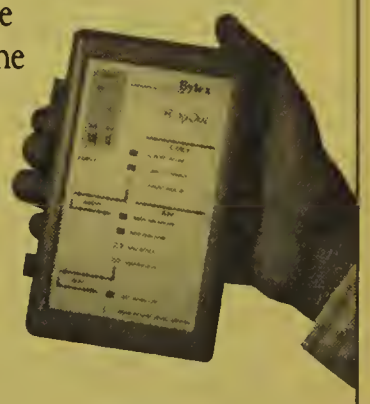

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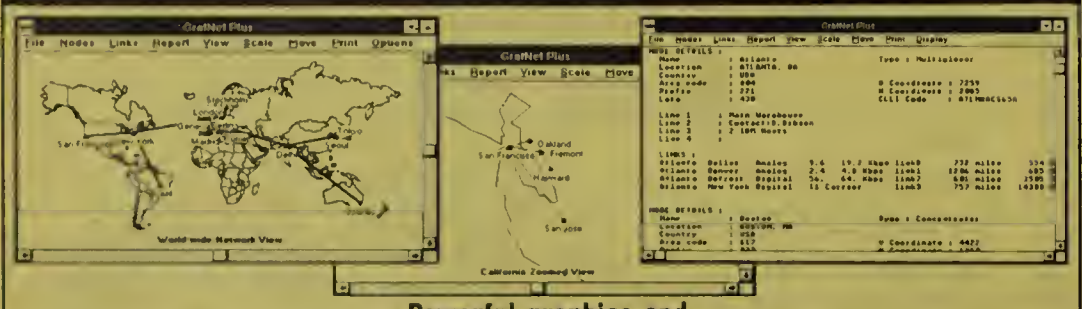

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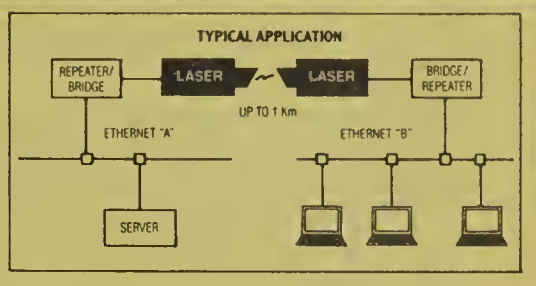

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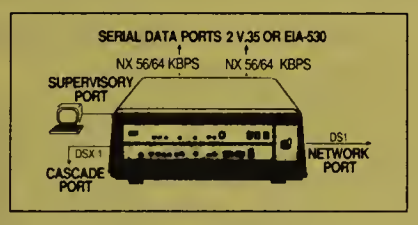

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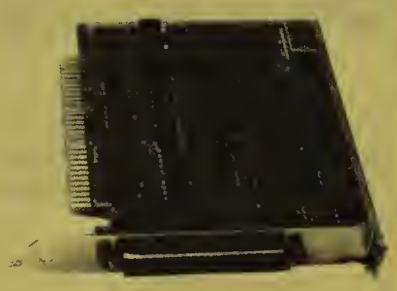

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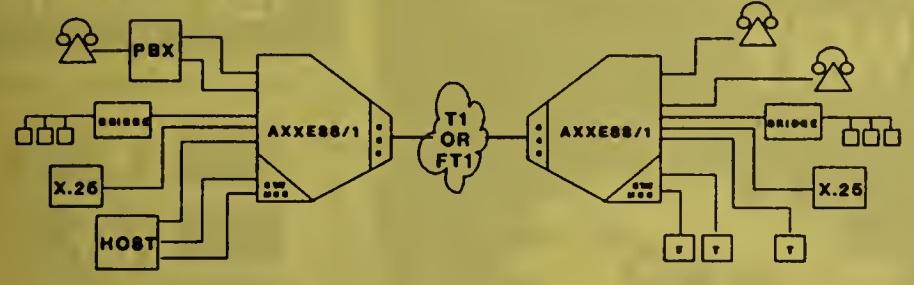

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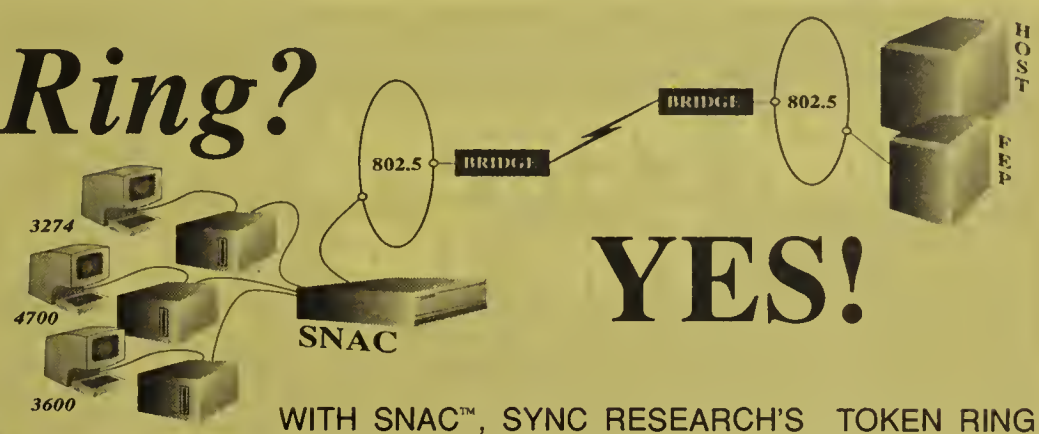

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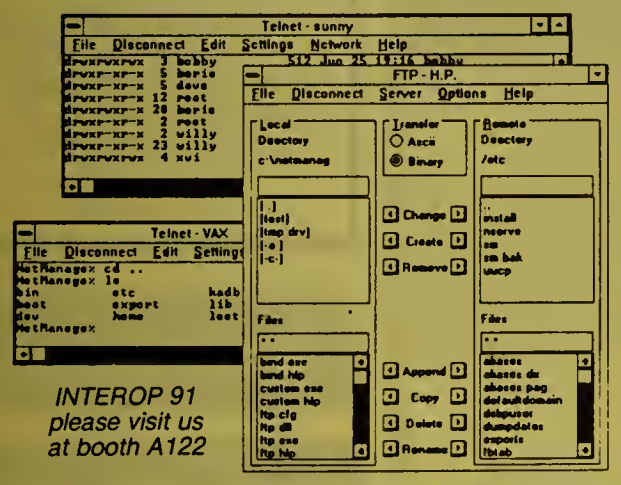

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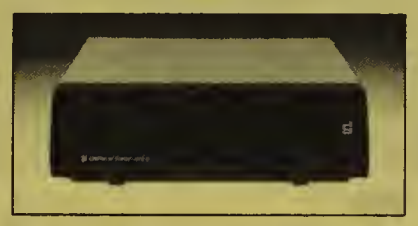

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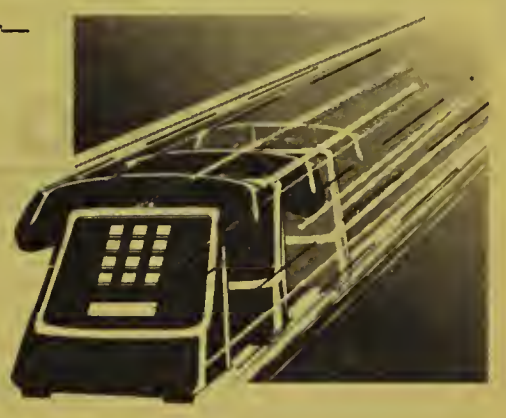

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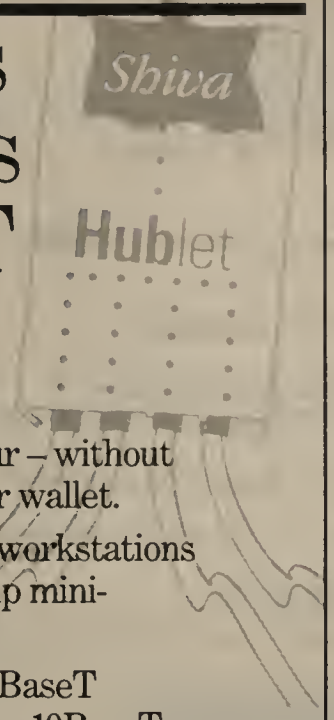

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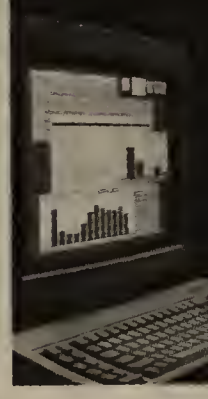

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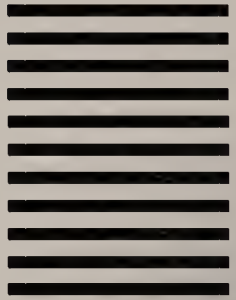

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(continued from page 34)

"We are pleasantly surprised with the [X.500] interconnectivity," Demco says. The directory has several thousand names from the campus telephone directory, but X.500's technical complexity limits use of the directory to those developing software or services. The next step will be to make the directory available to the entire campus, an effort limited to the computing platforms connected to the school's X.400 network.

"Directory problems are typically data base management problems," Demco says, referring to duplicate information. "Reliability of information is important in a distributed data base."

"The administrative problem is the hardest one," agrees Dover Beach's Rose, formerly with X.500 developer Nysernet, Inc. of Syracuse, N.Y., and its spin-off, Performance Systems International, Inc. of Reston, Va. "Few organizations have a central place for information, and just getting names, phone numbers and facilities gives three lists to coordinate."

Nysernet developed an X.500 white pages directory to coordinate academic research and is affiliated with the Internet, which has a large operational X.500 implementation that serves an estimated two to three million users a day.

Another problem Rose points out is directory content, which is "only as good as the quality and quantity you put into it." Content affects scalability, depending on the permissiveness of each site and its update frequency.

Getting in synch

Ensuring synchronization of an X.500 directory is a major problem, says Dave Taylor, vice-president and director of interenterprise systems consulting at Gartner Group, Inc., a communications consulting firm in Stamford, Conn.

Taylor notes that network directors must determine the level of service and guarantees of up-to-date information they want to provide to their users. He says that the technology allows more frequent updates than most businesses require or administrative time allows and that weekly updates should meet all requirements.

Boeing Computer Services' Bride thinks distributed directories need a master directory to resolve synchronization issues. "We're not sure yet," she says. "We may run with the existing directories and start a new one just to support OSI capabilities. Until then, much will still be done by humans."

Is synchronization a dated concept, given X.500's distributed approach? A synchronized system has growth limits: it copies everything-to-everything, and implementing another directory adds complexity. An X.500 directory updates once, many-to-many, and knows to search for requested objects on other systems. It requires less frequent copying — just enough to maintain performance.

"The thing to keep in mind is that X.500 is not a distributed data base, which has consistency [because it is instantly updated]," Rose says. "X.500 is a directory system and only approximates [the information gap resulting from the time lag between updates]. You may or may not get back the information you requeste, because of the update feature."

Synchronization's usefulness as a migration path to X.500 is also limited by the lack of a single synchronization format used by all vendors. User pressure may force developers to cooperate on an ad hoc standard, creating what David Knight, director of market development at Retix, terms a short-term solution. The Santa Monica, Calif., company licenses its X.500 source code to developers.

The real benefit

Large users want X.500 so they can build new applications and manage their nets more easily. E-mail and other messaging applications, such as electronic data interchange and fax, are a starting point, but the ability to build E-mail-enabled and object management applications is the real benefit of distributed computing.

"Boeing's objective is to move multiple information types, such as compound documents and graphics, and deploy them in 'pockets' where you don't need global connectivity," Bride says. "We have a prototype capability for compound documents using X.400 now. This approach has phenomenal potential; 50,000 subscribers primarily need text only. We want sophisticated X.400 applications within work groups and need X.500 administration for growth."

Donaghy points to Hughes' successful E-mail-based electronic routing application. "We have to get past the messaging syndrome and build applications using messaging applications on top of the base technology," he says. "We weren't selling a technology or E-mail but were giving users a tool to get their jobs done easier. We plan a huge ramp-up of E-mail tools."

Donaghy says he believes that notes and messaging do not justify a high-quality network and directory, and that to clear the funding hurdle, a technology must provide better time to market or some other competitive advantage.

X.500 will help Boeing with its backbone router-based network and X.400 deployment, Bride says. Routers and bridges generate lots of traffic, which an X.500 directory will minimize by tracking nodes on the network and providing addresses and physical locations. "This reduces administrative upkeep and gives a logical name for who, what and where," she says.

Boeing's high-administrative burden

(continued on page 46)

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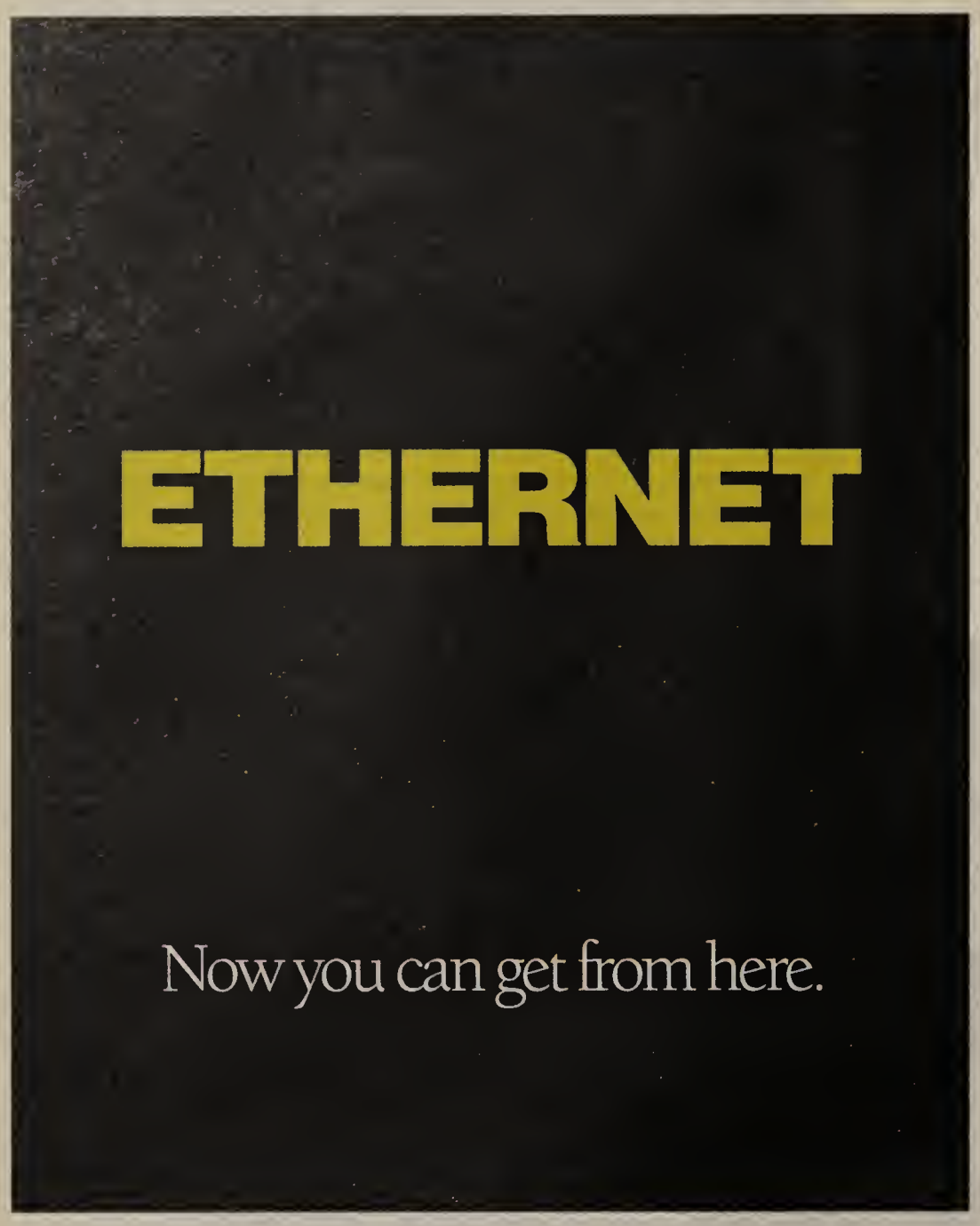

(continued from page 45)
will also remain for X.400 until it has a unified group of directories. "X.500 is a critical path item to manageable, large messaging systems for large companies and between large companies," she says.

Many confuse X.500 with a data base. A commercial data base is set up for transaction-oriented reads and writes; X.500, however, is optimized for very fast reads.

> "I can kludge it, but no vendor has it all," says Bank of Boston's Stormont.
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The difference is more critical when X.500 is used for object-oriented applications than when it is used for messaging, says HP's Adrian Carol Albin, X.500 product manager in Cupertino, Calif. She conceptualizes X.500 as the intermediary between data base management and networking concepts, blending both into a new technology.

But BASF's Freising thinks data base vendors could design an application that is optimized for directory queries rather than the updates characteristic of a relational data base. Ed Balthasar, section head at Hughes' Information Exchange Technology group, also says he is waiting for a data base company to develop an X.500 directory application package.

Bank of Boston's Stormont wants an X.500 directory that has a relational way to get, for example, a name in one application from an identification number in another application. Relational capabilities would help her develop applications such as signature authorization and forms routing. "I can kludge it, but no vendor has it all," she says.

Information disclosure

Security tops nearly every user's list of concerns with regard to X.500. To keep it in perspective, Hughes' Donaghy says, "We need to examine which of our fears are well founded and which are just fears. Not many organizations have made access policies in general, not just for X.500, and implementing X.500 will force net managers to review and formalize policies."

The fear factor soars when external access to data is considered. "Secure data [such as accounting or personnel information] should not be kept on X.500, which is designed for sharing," HP's Albin says.

Like voice directories, public X.500 directories will come in white- and yellow-pages versions. White pages directories may portray a level of organizational detail, such as departments and employee names, that many businesses oppose disclosing to outsiders.

Yellow pages directories, in contrast, organize businesses by categories and provide minimal information. Because of security considerations, early public X.500 directories will probably be yellow pages directories, allowing maximum access to limited information, such as sales and customer service numbers, and cutting down on junk E-mail to individuals.

Imposing a store-and-forward mentality on networked systems can create security islands, suggests Boeing's Bride. Information can be restricted by not providing certain systems with addresses of forbidden systems. This is akin to the customary practice of visually inspecting information for approval before sending it to another system, a procedure that becomes more difficult as the system grows.

Store-and-forward over a value-added network (VAN) is more secure for file transfers of executable programs because the VAN provides its own additional security for virus protection, Bride says.

Access control is related to replication and caching, according to Rose. Where replication makes complete, exact copies of a directory for other directories' servers, caching works with partial information, querying another server, remembering just the new information and storing it on the local server. Caching allows net managers to control costs by maintaining X.500 address information locally, but they can't cache without knowing the access control policy.

X.500's missing pieces

Observers agree that the market for X.500, established in 1988, is developing at about the same rate or faster than that of X.400, which is running a year or two behind expectations. Missing from the 1988 standard but planned for 1992 are two important pieces: access control and replication.

Access control is a must for users, according to Rapport's Myer. "It requires two things: authentication and a standardized way to express the kinds of access controls you want," he says.

Replication is not required for X.500 to work, but experience shows that frequently accessed information should be close to the people who need it, Myer says. "There is a consensus that some replication is needed [for the directory] to work efficiently," he adds.

A good directory product also allows users to define object attributes, and X.500 allows options. But unlike X.400, which is "a laundry list of service elements, the core machinery of X.500 is pretty important, and users take a risk if they don't understand it," Myer says.

Extensions in the 1992 standard will define the directory schema and a means for the directory to publish a schema, such as an organizational structure or other methods by which the user chooses to organize data.

Migrate or hold tight?

Not everyone agrees that X.500 is necessary. H. Daniel Heist, president of Proto-Comm Corp., works with carriers to interconnect X.400 nets and calls X.500 a big boondoggle. "It's too complicated and doesn't address the issue," he says.

Heist explains that the problem is the addressing in X.400 itself and that all users really need is a simplified addressing scheme. "We don't need a directory; we need an [X.400] address," he says.

> "You can't get along without X.500 for the long term," says Boeing Computer Services' Bride.
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For users such as Bride who believe otherwise, the question is how to migrate to X.500 and coexist with currently installed directories. "You can't get along without X.500 for the long term," she says.

Bride says she believes that users who don't include X.500 in their long-term network vision run the risk of installing technology that suits them in the short term but eventually becomes an albatross because it lacks scalability. "Otherwise," she says, "you'll get into something, can't scale it, and you're stuck with it."

For those thinking of interim steps to X.500, Rose advises questioning whether the interim step significantly accelerates the move to the end goal. "Most interims end up long term and are as much work as jumping to the final solution," he says. But users need solutions now.

According to BASF's Freising, "It's always the same game with vendors: Wait six months. X.500 will be good news for users — in the future."

Letters

continued from page 29

desktop laser printers), and can send information at speeds up to 64K bit/sec.

Even many Group III machines on the market use plain paper and have high-resolution capability. Many Group III and Group IV fax units now come with confidential mailboxes, a feature that allows only a designated person to access and retrieve a context-sensitive fax.

I am a strong believer in electronic mail and computer connectivity. But even the latest and greatest E-mail systems cannot fully address all situations.

How do you place a printed document into your system for transmission to another location (retype the entire document or scan it into memory as image data with 97% accuracy on conversion)? How many gigabytes of your system's memory storage will be eaten by nondeleted or maintained documents? How will you interface your computers with other companies' and their different systems?

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Lee Vester
Product marketing specialist
Group IV facsimile
Canon U.S.A., Inc.
Norcross, Ga.

Crescendo to deliver FDDI over copper

continued from page 1

The new products are fully compliant with ANSI's Class B requirements for data-grade wiring as well as ANSI's Class A requirements for D-type Inside Wiring (DIW), standards for sending data over traditional telephone wiring. The CDDI scheme can support wire runs at distances as far as 50 meters when used with DIW and as far as 100 meters when used with data-grade and shielded twisted pair, the company said. The FDDI standard for fiber cable supports distances as far as 100 meters.

Because Crescendo's approach is proprietary, it will not be compatible with products based on current FDDI chipsets from companies such as AMD Co. and Motorola, Inc.

Marleen McDaniel, vice-president at Crescendo, said products based on standard FDDI chipsets can work with Crescendo's if the standard physical media dependent (PMD) chip is replaced with Crescendo's proprietary PMD chip. She said the company is petitioning ANSI to recognize its PMD chip as a standard way to support FDDI over unshielded twisted-pair wiring.

Bill Redman, a network analyst at Gartner Group, Inc., a consultancy in Stamford, Conn., said the fact that Crescendo's encoding scheme is proprietary could be a major stumbling block for the company.

Redman said Crescendo is trying to grab market share by releasing its products before the FDDI standards group has finalized its approach for unshielded twisted pair, a tact SynOptics Communications, Inc. used successfully in the market for Ethernet products that support unshielded twisted-pair wire.

But SynOptics thrived because there was pent-up demand for such products, Redman said. Crescendo, on the other hand, faces uncertain market demand.

"People continue to say that 100M [bit/sec] is the way to fly, but the applications aren't driving it yet," Redman explained. "I would expect very few people would require this solution today because Ethernet and token ring still offer a tremendous amount of bandwidth."

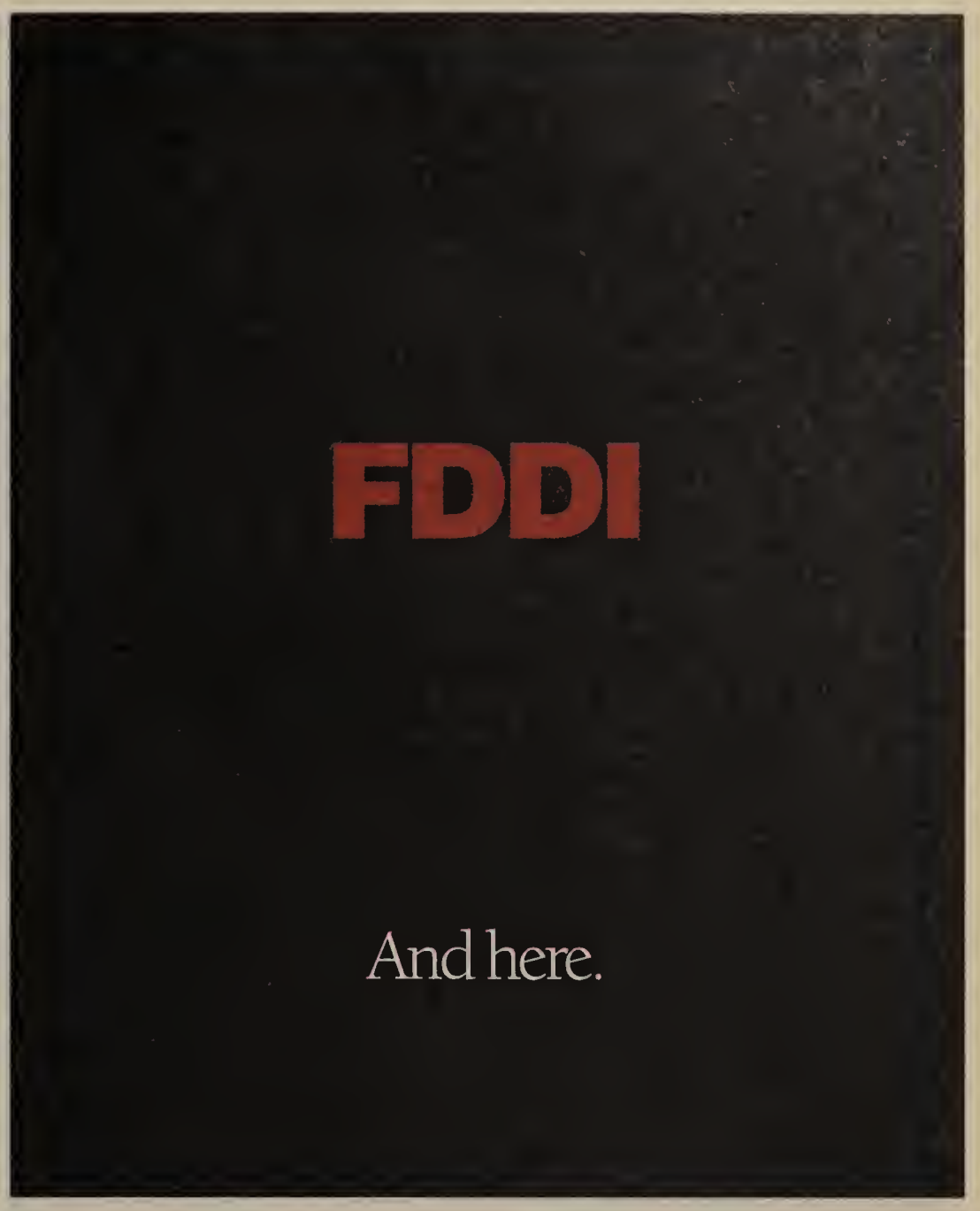
In addition to Crescendo, SynOptics and IBM are working toward developing schemes for running FDDI over twisted pair. The approaches of those companies, however, differ from Crescendo's in that both require Type 1 shielded twisted-pair wire vs. unshielded wire, and both have focused on using standard FDDI 4B/5B encoding.

IBM's scheme uses a low-power signal to meet FCC emission requirements, but it also requires sensitive receiver circuitry that could make products expensive.

SynOptics' solution, which promises to be less expensive, may have trouble meeting the emission requirements ("Is it the end of the line for twisted pair?" *NW,* April 29).

The Crescendo 1000 net hub is an eight-port device that can support shielded or unshielded twisted-pair wire links to Crescendo 300 CDDI adapters for Sun SPARCstations. The hub comes with two additional ports that can be used for fiber connections or for additional twisted-pair links.

Product pricing and availability will be announced at INTEROP, McDaniel said.



3Com touts new bridge/router, hub

continued from page 4

FDDI LANs, and wide-area interfaces.

Both routers support wide-area interfaces at speeds up to T-1, as well as X.25, frame relay and Switched Multimegabit Data Services.

The company said future releases of the routers will support token-ring LANs and T-3 interfaces.

NETBuilder, 3Com's current router, does not use RISC chips and only supports Ethernet LANs.

NETBuilder II's protocol support includes the Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet, Open Systems Interconnection, Xerox Corp.'s Xerox Network Systems, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Apple Computer, Inc.'s AppleTalk. It will also support routing protocols such as the Routing Information Protocol, Open Shortest Path First and the OSI Integrated Intermediate System to Intermediate System protocols.

In addition, the device will support the Spanning Tree Algorithm, transparent bridging and Source Routing Transparent.

NETBuilder II pricing ranges from $10,495 to $32,695. The products are excepted to ship in December.

Also unveiled last week was the company's LinkBuilder 3GH intelligent hub, with scalable bandwidth capability. The hub is based on Synernetics, Inc.'s LANplex 5000 multiprocessor hub architecture and uses 3Com-developed software. The hub chassis houses as many as 12 modules, each supporting as many as eight Ethernet LANs and a single FDDI network. The hub also offers backplane support for nine networks, comprising three FDDI rings, three Ethernet links, three 4M or 16M bit/sec token-ring LANs and a 500M bit/sec VMEbus.

Ethernet-to-FDDI bridging can be achieved at filtering rates of 500K packet/sec per module with aggregate throughput of 400K packet/sec.

The company said it will add token-ring modules in a future release as well as integrate the NETBuilder II into the hub. This will expand the hub's capabilities to include multiprotocol routing of TCP/IP, OSI, XNS, IPX, DECnet and AppleTalk.

The NETBuilder II and LinkBuilder 3GH are managed using the Simple Network Management Protocol as well as through 3Com-developed network management applications that run on a Sun Microsystems, Inc. SunNet Manager, a standards-based Unix net management platform.

Pricing for the LinkBuilder 3GH ranges from $27,500 to $150,000. The product is expected to ship in December.

Randy Cosby, network manager for Texas Children's Hospital in Houston said he is eager to use 3Com's new router and hub to support medical imaging and video applications across the hospital's seven-building campus internetwork.

"We already have a need for more bandwidth and have the fiber in place to implement an FDDI network, but until now, I haven't found a product that I feel could reliably handle our bandwidth requirements," Cosby said. "3Com will be our vendor of choice for FDDI to the desktop, not only because of the new products, but also because of the company's service and support."

CSC grabs up giant outsource contract

continued from page 9

ing to continually reinvest in computer and network equipment and facilities, which aren't directly related to the company's core business, said Asaph Hall, vice-president of information systems and administrative services at the company.

The mammoth deal is a big boost for CSC, which is battling major outsourcing vendors such as Andersen Consulting, Electronic Data Systems Corp. and IBM's Integrated Systems Solutions Corp.

CSC said it expects to generate $350 million in revenue during the first year of the contract. At that pace, CSC could generate $3.5 billion in revenues over the life of the deal. The acquisition of General Dynamic's facilities doubles the mainframe processing power CSC has available for outsourcing services and gives the firm an extensive nationwide net.

These assets, along with the expertise of the General Dynamics staff, will enable CSC to support additional outsourcing customers, especially in the defense and manufacturing industries. Currently, CSC provides outsourcing services to about 250 mostly small and mid-sized businesses.

CSC has a sizable number of employees with network expertise, although few existing CSC employees are expected to be transferred to the General Dynamics account. And for the most part, former General Dynamics employees will continue to manage the firm's network operations.

"The deal makes perfect sense," said Howard Frank, former chairman of Network Management, Inc., a large systems integration company in Fairfax, Va. "CSC has plenty of government experience that appeals to a large government contractor like General Dynamics."

CSC officials said they don't have any plans to consolidate General Dynamics network with CSC's internal net.

HP unwraps low-end 10Base-T entries

continued from page 15

The bridge is priced at $2,500 and can ideally connect between 20 and 30 users.

"The entry-level hardware market has not been approached by the market leaders," said Housley. "So we are establishing ourselves in low-end, entry-level networking."

Rounding out the announcements are the new HP EtherTwist PC adapter cards that support Novell's NetWare 3.11 and Microsoft's LAN Manager 2.0.

The new board family includes eight- and 16-bit Industry Standard Architecture (ISA) cards as well as Extended ISA and Micro Channel Architecture.

An eight-bit EISA card costs $345, while a 16-bit card costs $445. A six-pack of eight-bit EISA cards and one of 16-bit EISA cards costs $1,650 and $2,250, respectively. All products are available now.

BT delivers on frame relay, details pricing

continued from page 1

mestic frame relay service, it is expected to be the first to offer international frame relay. Prices for international frame relay are expected to range from $3,000 to $4,600.

WilTel, the first company to deliver a public frame relay service, does not publicly release pricing for its WilPak service, a spokesman said. The company will only provide pricing information to users.

Frame relay is an emerging CCITT and ANSI standard for packet transmission that provides substantially higher transmission speeds than traditional X.25 packet networks. It accomplishes this by stripping off much of the error-correction capabilities of X.25.

> "Users are interested in 56K and 64K access because of the pricing issues associated with higher speed service," said BT North America's Joan Carmichael.
>
> ▲▲▲

Interconnection of local-area networks is widely viewed as a key application for frame relay, and BT North America will support a number of LAN protocols, including the Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet and Apple Computer, Inc.'s AppleTalk.

Initially, BT North America will offer access to its frame relay service over 56K and 64K bit/sec leased lines. Although competitors such as Sprint Data Group will offer frame relay via T-1 access, BT North America said it has conducted studies that show lower bandwidth access will satisfy the majority of customers.

"Users are interested in 56K and 64K access because of the pricing issues associated with higher speed service," said Joan Carmichael, manager of open systems product management for BT North America (see "Women's clothier dresses up net with frame relay," page 13).

BT North America plans to enhance its frame relay service with higher speeds and new features during the next five years.

Initially, ExpressLane will be offered as a separate subnetwork on the firm's T-1 backbone network. It will support only permanent virtual circuits, meaning that a network pathway must be set up between fixed end points.

In 1992, BT North America is scheduled to enhance the frame relay service to support switched virtual circuits, which do not require preprovisioned pathways, and to add a gateway so that the firm's X.25 users can communicate with frame relay users.

Also, in the third quarter of 1992, BT North America will conduct studies to determine when to offer higher access rates.

By 1995, BT North America plans to have completed upgrades that will enable the network to support transmission speeds up to 52M bit/sec, giving it support for Synchronous Optical Network and T-3 transmission rates.

The firm also plans to work with other carriers that are planning to offer broadband Integrated Services Digital Network to provide a link to its frame relay customers through other carriers' switches.

Sprint Data lays out rollout plan, pricing structure for frame relay

TCA announcement also includes news of beta user and deal to resell Wellfleet routers with new service offering.

By Bob Brown
Senior Editor

SAN DIEGO — One year after announcing the industry's first public frame relay service, Sprint Data Group last week revised its schedule for rolling out the service and outlined its pricing strategy.

The company, a unit of US Sprint Communications Co., also said it has begun the first beta test of the frame relay service with Ernst & Young, a consulting firm based in New York, and announced an OEM agreement under which it will resell Wellfleet Communications, Inc. routers that can be used to access the service.

Sprint Data said it will begin taking orders for its frame relay service next month and will make the service generally available in December. The service will be accessible through more than 200 points of presence in the U.S. and will be available in London and Tokyo in early 1992.

Sprint Data initially pledged to deliver the service by the end of the third quarter, but the rollout took longer than anticipated due to several factors, including the evolution of frame relay standards, according to Bill Pfeiffer senior vice-president of Sprint Data. Such standards include the Frame Relay Implementors Forum's Local Management Interface.

Sprint Data's frame relay service, supported by its own TP4900 packet switches, will be accessed at rates of 56K bit/sec, T-1 and fractional T-1. The service will be designed to support users' bandwidth-on-demand applications, such as local-area network interconnection.

Jim Nestor, director of networking for Ernst & Young's national technology department, said the company began its beta test last week and plans to continue it through mid-December. It will test the frame relay service for LAN-to-LAN interconnection and file transfers, possibly including digitized voice mail.

Nestor said frame relay should be useful in supporting the unpredictable, bursty data traffic generated at its offices, many of which do not send enough data to warrant dedicated lines.

The consulting firm has already implemented the frame relay service at five large metropolitan offices, including one in New York, using 56K and 112K bit/sec access links and Cisco Systems, Inc. routers.

Ernst & Young will also be examining how frame relay pricing compares to the cost of dedicated facilities.

Sprint Data announced its pricing strategy without actually specifying how much the new service will cost. It also did not compare the pricing with that of its existing private-line services or other carriers' frame relay offerings. Pfeiffer would only say that the service will cost less than dedicated lines.

The carrier plans to unveil detailed price information at an October meeting with customers.

What Sprint Data did reveal was that its frame relay service will include three pricing components — the access charge from the local telephone company, a port charge that will vary based on speed and a fee for each permanent virtual circuit setup in the net.

The carrier will offer a premium service, dubbed a reserved service, at a fixed monthly rate per permanent virtual circuit, the preestablished path over which frame relay traffic crosses.

Sprint Data will guarantee a predetermined throughput level even when the network is heavy with traffic from other customers. For example, if a customer reserves 128K bit/sec of bandwidth, that bandwidth will always be available.

"We are the only frame relay vendor that guarantees a sustained rate," Pfeiffer said. "Customers will be assured that vital information always flows through, even during periods of peak usage and traffic density."

Sprint Data's standard offering will be usage-based with a cap on pricing below that of the fixed rate charged for the reserved service. This offering will be best suited for users that cannot predict their traffic requirements or have very low traffic requirements, he said.

"With the standard service, customers can choose frame relay at competitive prices and pay for as much bandwidth as they require at a particular time," Pfeiffer said. "The standard service is ideal for customers in sites with lower volumes of traffic and less critical applications."

Users will be able to buy a combination of reserved and standard service as well.

Sprint Data will sell or lease equipment certified as compatible with its frame relay offering. Under an agreement with Wellfleet, Sprint Data will sell Wellfleet's routers under the SP8200 name, either as a complement to the frame relay service or in conjunction with other services.

The carrier will also offer a bundled service with pricing that covers equipment and service.

Sprint Data's frame relay service and the Wellfleet routers will be manageable under existing US Sprint management systems, including its TP5000 line.

Pfeiffer said Sprint Data is offering frame relay in hopes of providing users with a smooth migration path to broadband Integrated Services Digital Network services and other advanced network offerings. US Sprint recently issued a request for proposal for cell relay switches and technology that will provide a foundation for new services.

Proteon enhances SNA, DEC support

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LAN internet backbones via another new software upgrade that encapsulates SNA data in Transmission Control Protocol/Internet Protocol packets.

To support IBM terminal traffic, Proteon is offering SDLC Relay, a software enhancement that will enable users to directly attach synchronous devices such as cluster controllers to a Proteon bridge/router.

Both of these enhancements were announced earlier this summer ("Proteon to support SNA on internets," *NW*, July 29) and are available immediately.

The software enhancements cost $750.

To provide interoperable bridging and routing between DEC and IBM environments, Proteon plans to implement by mid-1992 the IEEE Source Routing Transparent protocol, which is a standard that defines how to bridge between token ring and Ethernet networks.

In addition to the software upgrades, Proteon announced a second-generation FDDI interface for the CNX 500 router that embodies a multi-RISC processor design based on Advanced Micro Devices, Inc.'s 29K RISC CPU, Intel Corp.'s i960 RISC accelerator and National Semiconductor Corp.'s FDDI chipset.

RISC architecture

The RISC architecture allows the interface to process data packets at the full 100M bit/sec FDDI line speed and accommodates a variety of physical media, including multimode or single-mode fiber and copper FDDI.

Proteon's existing FDDI interface is not RISC-based.

The company is offering a special FDDI introductory program. The offer includes the CNX 500 router with an FDDI and a dual-port Ethernet interface or two single-port, token-ring interfaces for $18,500. The introductory offer is available now and will be in effect until the end of the year.

Sniffer gets smarter with new version

continued from page 2

Internet Protocol, Sun Microsystems, Inc.'s Network File System, Novell, Inc.'s NetWare and Digital Equipment Corp.'s DECnet.

Support for other protocols, such as Apple Computer, Inc.'s AppleTalk, Open Systems Interconnection and Xerox Corp.'s Xerox Network Systems, will follow in future releases.

According to analysts, Network General's current Sniffer is often criticized for being difficult to use because it displays actual packet data and protocols traveling across the network and requires highly technical administrators to interpret the data. But the Expert Sniffer will cut through the technical data to present users with graphical or plain English explanations of network conditions.

When first hooked up to the net, the Expert Sniffer will automatically discover where network devices are located and then draw a map of the network — identifying which nodes are bridges, routers, servers and end-user workstations. The Expert Sniffer will also include the names of these devices in the map as well as which protocols they are using.

The Expert Sniffer will monitor traffic coming across the network and learn specific characteristics of the net such as traffic patterns and average usage. That data is stored in an object-oriented data base for real-time analysis or historical analysis over a longer period of time.

To prevent data base saturation, the software is written to automatically discard outdated information — for example, information more than a month old — unless otherwise instructed.

From the information about average usage in the data base, the system automatically sets thresholds by which it can determine the existence of unusual activity on the net. If activity nears any of the preset thresholds, the Expert Sniffer automatically attempts to determine the problem and devise a possible solution. According to Network General, the device can discover more than 100 network faults — from electrical problems on the wire to application software problems.

Network General said the Expert Sniffer will make other Sniffer versions obsolete, and the company plans to begin phasing out the older versions of the product when the Expert Sniffer ships in mid-1992.

In conjunction with the introduction of the Expert Sniffer, Network General also unveiled a software upgrade that will let existing Sniffer products perform network monitoring on Fiber Distributed Data Interface nets.

Although Network General has yet to announce specific pricing, it said the Expert Sniffer will cost no more than $5,000 above current Sniffer prices. For those customers currently paying $1,500 per year to subscribe to Network General's Software Upgrade Service, the Expert Sniffer software will be free of charge.

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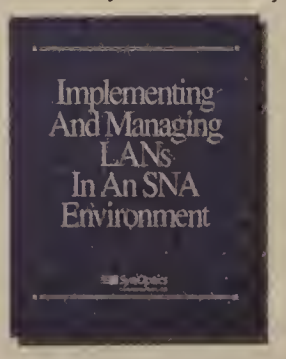

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HP centralizes control of nets

continued from page 1

On the computing side, HP is consolidating more than 150 data centers, run by independent business units, into less than 10 data centers that will be managed by corporate IS by the mid-1990s. According to Taylor, the consolidation is expected to cut data center operations expenses by 10% to 15%.

HP is also shifting oversight of hundreds of networking professionals from independent business units to the corporate networking department. What's more, about 200 of the department's expected 550 staffers will be reassigned from wide-area network management to LAN support.

Lloyd Taylor

HP began plotting the reorganization last year, after conducting benchmark studies that showed its data center and network expenditures were significantly higher than other companies of its size.

Taylor said HP spends 4% to 6% of its revenue on IS and about 1.5% on voice, data and video communications. HP's revenue last year totaled $13.5 billion, up 11% from 1989. Last year's net earnings were at $739 million, down 11% from the previous year.

The benchmark study also revealed that HP's management of IS was much more decentralized than other users'. Henry Taylor, HP's manager of corporate network services, said only 100 of the about 550 people overseeing HP's net operations report directly to the corporate network group today.

The remainder report to managers of local facilities or to managers of HP's Asian and European business units.

HP runs a global private network composed principally of T-1 and E-1 circuits that shuttle more than 700G bytes of data per month between hundreds of company locations in more than 70 countries.

Henry Taylor said that, in November, the computer maker will officially transfer management responsibility for the 550 employees running the corporate net from independent divisions to the corporate networking group. About 140 people will then support the corporate network here and in eight to 10 network support centers in the U.S., Europe and Asia.

Another 200 employees will support the WAN at HP sales offices and manufacturing facilities around the world, while 200 staffers formerly involved in WAN operations will be reassigned to installing and managing LANs.

Henry Taylor said HP will be able to manage the WAN with fewer people because expertise will be concentrated in fewer facilities. For example, rather than needing two people in each of its 20 offices to support the WAN, HP can use 10 people at one network center to support those offices.

The personnel reduction will enable HP to reduce by half the amount of money required to run the WAN, assuming traffic levels remain flat.

"This is more cost-avoidance than cost savings," said Lloyd Taylor. "This way, we can increase our LAN support and keep our overall costs neutral."

FCC to develop caller ID service

continued from page 6

Some RBHC officials expressed concern about upsetting regulatory arrangements currently in negotiation between the RBHCs and the states.

For example, a spokesman for Ameritech said the carrier expects a decision from the Illinois Commerce Commission this week on whether it will be allowed to offer caller ID in that state and on what terms.

Ameritech was reluctant to comment prior to the decision.

The different state regulations regarding caller ID raise the issue of whether the service can be implemented on a nationwide basis.

Some lawmakers, such as Sen. Herb Kohl (D-Wis.), contend that the new ANI technologies currently violate federal wiretap laws and that those laws need to be modified.

The emergence of conflicting rules spurred the FCC to enter the fray.

"That's one reason we thought it was a good time to establish a federal policy model for interstate service," Firestone said. "It's important that caller ID be made available as an interstate service."

Firestone noted that users will be expected to pay for call-capture services, which raises the question of cost-allocation rules.

He said the FCC wants to determine what protion of the upgrade to Signaling System 7, the out-of-band signaling method required to support ANI, should be borne by users. Comments on the FCC proposal are due in 60 days.

SynOptics gets FDDI support

continued from page 4

tempts to access a restricted resource, LattisNet Manager disconnects the user's station from the network and notifies the network manager.

The software also has an Autotopology feature, which can automatically calculate the network's configuration and draw a network map. The new feature can also automatically redraw the map to reflect any moves, adds or changes in the net topology. Users can customize maps through color coding.

LattisNet Manager Release 2.0 also supports out-of-band signaling of net management information via dial-up or RS-232 links to the NCEs. This provides continuous monitoring should a LattisNet 3000 hub fail or the network crash.

Asset management

The software provides asset management via a new feature called Global Show Nodes.

Global Show Nodes enables a network administrator to easily find various network nodes by listing different addresses, such as a station's media access control address or its local administrator address. In addition, the feature provides maps for all the stations on a network and a variety of screen views to pinpoint conditions at affected devices.

Global Show Nodes offers a graphical representation of the entire net, including bridges, segments, network rings and routers.

By clicking on an object's icon, which is shaded red to denote failure, a network manager can view progressively more detailed maps of the affected areas of a network.

LattisNet Manager Release 2.0 is priced the same as Release 1.1. It comes bundled with SunNet Manager for $6,995 and is available without SunNet Manager for $3,995. Both versions are scheduled to be available by year end.

Netrix adds low-end switch

continued from page 2

maximum of 20, 28 and 64 ports, respectively. Each port can be configured to support local- or wide-area links.

The Model 1205 supports circuit-switched throughput of 8M bit/sec, while the 1207 and 1216 each support 64M bit/sec. Total frame relay is 1M bit/sec on the Model 1205 and 3M bit/sec on the other two.

All three models support X.25 packet throughput of at least 300 packet/sec, said Thomas Jones, vice-president of marketing at Netrix.

By contrast, the #1-ISS Model 10 supports 2,000 packet/sec X.25 throughput and total frame relay throughput of 6.4M bit/sec.

However, the Series 1000 supports more throughput on a per port basis than the larger Series 10. On a single T-1 frame relay port, for example, the Series 10 offers about 400K bit/sec sustained throughput, whereas the Series 1000 can sustain the full E-1 rate of 2.048M bit/sec, said Alan Kobran, director of product marketing for Netrix.

Malone said the ability to drive frame relay at full line speeds puts Netrix in a class by itself but said it would make more sense to offer the capability in a high-end backbone node rather than a feeder multiplexer. Netrix said it is looking at that possibility.

The company achieved its frame relay gains with the addition of tightly coupled RISC processors dedicated to frame relay processing. In its Series 10, Netrix uses multiple Motorola, Inc. 68030 microprocessors for all its processing requirements.

RISC processors are only one of three reasons Netrix was able to build the same level of functionality into the Series 1000 at prices 35% to 50% lower than the Series 10 for comparable configurations.

Another reason was it was able to port 70% of the Series 10 software to the Series 1000, including most of the high-level features that users deal with, such as its software-configurable ports. That means the Series 1000 hits the street with well-proven feature software and future enhancements will apply to both product families, Jones said.

The third reason is the switching core of the Series 1000 supports pipelining, a feature usually associated with supercomputers, which allows it to perform multiple tasks in parallel.

Pipelining lets the Series 1000 read and process three bits at a time off the system bus, whereas most multiplexers process a single bit at any instant, Kobran said.

Next year, Netrix plans to introduce a number of new features that take advantage of pipelining, including direct local-area network links, Integrated Services Digital Networks Primary Rate Interfaces, compressed voice and LAN routing.

According to Jones, users can expect features of the Series 1000 to show up in other Netrix products as well. "Ultimately, the innovations we've made in this will get incorporated across the whole product line," he said.

The #1-ISS Series 1000 will go into beta test next month at Computer Sciences Corp. and Graphnet, Inc., and will be generally available by the end of the year. Pricing starts at less than $10,000. A configuration with four T-1 ports and 16 RS-232 ports costs less than $22,000.

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IBM rolls out AIX mux system

continued from page 2

TNM/6000 can execute commands and paint its graphical user interface (GUI) screen much faster.

"It's certainly more than twice as fast," he said, although he could not provide actual performance figures. IBM will withdraw the OS/2 TNM from the market in January.

TNM/6000 includes all the same functions as the OS/2 TNM, including the ability to collect alarm data from anywhere in an IDNX net and send it to NetView via a two-way link. Users can also build and execute predefined automation routines, such as for reconfiguring a network according to time of day. Routines can be triggered from a NetView console.

IBM announced two releases of TNM/6000. Release 1 includes support for the 9736, 9737, 9738 and 9739 Transmission Resource Managers (IDNX 20, 40, 70 and 90, respectively), the NetView link and a Secondary Workstation feature, which is a client software package that enables users to support additional RS/6000 management consoles.

Release 2 adds support for the recently announced NET Local Area/Wide Area Network Exchange (LWX), a packet processing module for the IDNX. It also supports access to the base TNM/6000 system from X Window System-based terminals. That feature requires no additional software, Sannipoli said.

IBM will also add support for the 9715 Access Digital Network Exchange (ADNX)/60, a recently announced low-end NET T-1 multiplexer that IBM last week said it will resell. IBM also said it will resell the ADNX/48, the intelligent T-1 channel bank NET acquired from Coastcom, Inc., although that product will not be supported under TNM/6000.

For users that don't require the graphics capability of the TNM/6000, IBM will sell the AIX Compact TNM/6000, which Sannipoli said includes the same functions as TNM/6000 but with a command line interface.

TNM/6000 Release 1, including the Secondary Workstation feature, will be available in January 1992. Release 2 will be available in June 1992. The product ranges in price from $34,000 to $218,000. Upgrades from the OS/2 version range from no charge for a four-node version to $4,000 for versions that support 17 or more nodes.

The two-way NetView link costs $10,000, the AIX Compact TNM/6000 costs $11,000, and the Secondary Workstation feature costs $25,000.

NET's SNMP package

NET's new SNMP Manager is software that runs on a Sun Microsystems, Inc. SPARCstation, which is the same platform that supports the company's Series 5000 IDNX net management system, to manage devices attached to a Transmission Control Protocol/Internet Protocol network or other devices that support SNMP.

Based on HP's OpenView Network Node Manager Release 2.0, the SNMP Manager will support NET's LWX, as well as its LAN Exchange/50, a Cisco Systems, Inc. bridge/router that NET resells.

Scheduled for availability in the fourth quarter, the SNMP Manager costs $15,000.

Banyan boosts VINES

continued from page 6

"This represents the first time Banyan has had SNMP support," said Dana Rasmussen, product marketing manager for VINES. "It's not directly related to the release of 4.11; it will run in any VINES 4.x environment."

The $495 agent will support Banyan's own VINES Management Information Base (MIB) in addition to objects in the industry-standard MIB II specification. The agent has to run on only one server on a given LAN segment; other servers on the segment simply appear as nodal devices.

Other net management tools announced last week include the Banyan VINES Assistant, a set of utilities for on-line diagnostics, performance tuning and trouble-shooting of VINES networks.

According to Banyan, the initial release of the VINES Assistant has 17 utilities, including StreetTalk Directory Assistance, which lets administrators customize names within Banyan's StreetTalk directory; a server capacity monitor; a mailbox cleanup utility; a network configuration reporter; a server configuration inventory utility; and a new mail indicator.

> According to Banyan, the initial release of the VINES Assistant has 17 utilities.
>
> ▲▲▲

VINES Assistant will be available next month and will cost $699. Orders shipped by Dec. 31 will be available at an introductory price of $499.

WAN support

Banyan's other announcements concerned wide-area network support. The company added inbound X.29 Dial-In support to work in conjunction with its existing X.29 outbound option. X.29 is a CCITT standard for communication between data terminal equipment and packet assembler/disassemblers.

The new software will let multiple users dial into a VINES 4.11 server through a single X.29 connection. It costs $995 and will be available in November.

Banyan also introduced the $2,495 ICAplus Intelligent Communications Adapter, which is available now. This server interface for Industry Standard Architecture (ISA)- or Extended ISA-based servers will support fractional T-1 links at speeds up to 384K bit/sec.

MCI to add INMS features

continued from page 6

ment tools, such as the ability to generate reports on traffic and alarm data for 800 and data services, as well as enhanced superframe performance reports, which the carrier says will allow customers to quickly identify network problems.

MCI said there will be no additional charge to current customers of INMS for upgrading to the new version. INMS costs between $500 and $2,500 per month, depending on the number of features included in the package. There is a $250 installation fee.

Also last week, the carrier announced MCI Perspective, an electronic billing option for Vision customers. Users will be able to download invoices and billing analysis software via MCI Mail. The software can be used on any DOS-compatible personal computer. "This gives customers their bill approximately seven days earlier than a standard bill," said Thomas Faulders, MCI senior vice-president for business marketing.

MCI has conducted beta tests of Perspective with 82 customers. Based on that trial, the carrier developed 24 standard reports for customers to choose from for call detail information. "We have 24 canned reports in [Perspective], not because we're so brilliant, but because we got a lot of feedback from our beta customers," Faulders said.

Perspective will be commercially available in November, although beta customers are already using the service, Faulders said. MCI will charge a $25 installation fee for Perspective as well as a nominal recurring charge.

The carrier plans to add the electronic billing capabilities of Perspective to its Portfolio services, a billing management and reporting offering.

French carrier unveils plan for LAN internet service

By Barton Crockett
Senior Editor

PARIS — France Telecom last week announced plans to deploy a nationwide ATM switched service by the end of 1992 that will enable users to route local-area network traffic over wide-area links at speeds up to 34M bit/sec.

The service promises to let users internetwork LANs more economically and avoid many of the transmission delays associated with public X.25 packet-switching services.

According to Michel Dupire, France Telecom's director of industrial relations, the carrier plans to support the LAN internetworking service via an Asynchronous Transfer Mode (ATM) network supporting standard 53-byte cells. The ATM overlay network will be based on nodes in eight to 10 major metropolitan areas, including Paris.

Dupire said the net will be supported by new ATM switching equipment from Thomson-CSF and Alcatel N.V. The network will run at 140M bit/sec.

Users will access the network via dedicated links ranging from 2M to 34M bit/sec, Dupire said. France Telecom will supply the customer premises equipment to link LANs into the ATM backbone.

Pricing for the service has not been announced.

Analysts said that if France Telecom meets its goal of delivering the service before 1993, it will move ahead of U.S. local exchange carriers, which are planning similar offerings.

The local carriers are basing their public LAN internetworking services on Switched Multimegabit Data Service (SMDS) technology, which enables users to send data at speeds up to 45M bit/sec within a metropolitan area. France Telecom's service will be based on similar technology.

"The BOCs have all these [SMDS] trials, but they won't have a commercial service for three to four years," said Michael Farabelli, a partner at Network Strategies, a network consulting branch of Ernst & Young in Vienna, Va. "This speaks well for France Telecom's technical capability."

IBM, BT plan OSI mgmt. link

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BT, which has previously demonstrated OSI links to its Concert integrated net management system, will announce that Concert will be available in the U.K. this year and in the U.S. in 1992, said Keith Miller, Concert product manager in Atlanta.

BT and IBM earlier this year announced a joint feasibility study on forging a link between Concert and NetView.

Bidirectional link

Sources who are familiar with the planned demo said the link between Concert and NetView will be bidirectional, meaning data will be able to flow in either direction between the two systems. Each system will be able to display alarms generated by the other and download configuration data into a single configuration data base.

Concert users will have to employ terminal emulation to take control of a NetView system, but it was not clear what level of control over Concert will be possible from NetView consoles.

Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C., said control is not necessarily what users want.

"Do you really want to manage one from the other? Probably not," Dzubeck said. "But you do want a centralized repository for all management information."

He said the link would enable Concert and NetView to share a common configuration data base, which is important since many of the same network elements must be managed by both systems.

If the trial goes off as planned, it will represent the first time IBM has demonstrated compliance with the OSI/NM Forum's Release 1 specifications, which include support for CMIP and all the Common Management Information Services, including alarm and event handling as well as definitions of managed objects.

Jim White, principal consultant for network technology at E.I. du Pont de Nemours & Company, Inc. in Wilmington, Del., said that compliance would be a big step for IBM. Adherence to OSI/NM Forum specifications will be important to implement systems that can manage multivendor nets and applications.

"They've done a lot of talking about [OSI management]," White said. "It will be exciting to see the first implementation of it."

The demo will also represent a major step forward in BT's efforts to line up support for Concert. Thirty vendors, including most major T-1 multiplexer vendors, have now committed to support it.

BT's Miller said most vendors will use CMIP to link element management systems with Concert. He pointed out that CMIP will enable Concert to maintain detailed data bases of net configurations that are automatically and continuously updated.

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